RUBBER and PLASTICS WEEKLY

VOLUME [illegible] NO. [illegible] OCTOBER 28 1961 ONE SHILLING

This way in

Collect

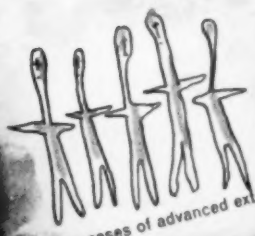
Three physicists mad about long chain molecules

Seven chemists devoted to mass polymerisation

Six merry master moulders.

Four engineers who prefer breaking things
(To find out how strong they are.)

Several stretching scientists
(Scientists who spend all day stretching)



Five cases of advanced extrusion

Umpteen fabrication fanatics

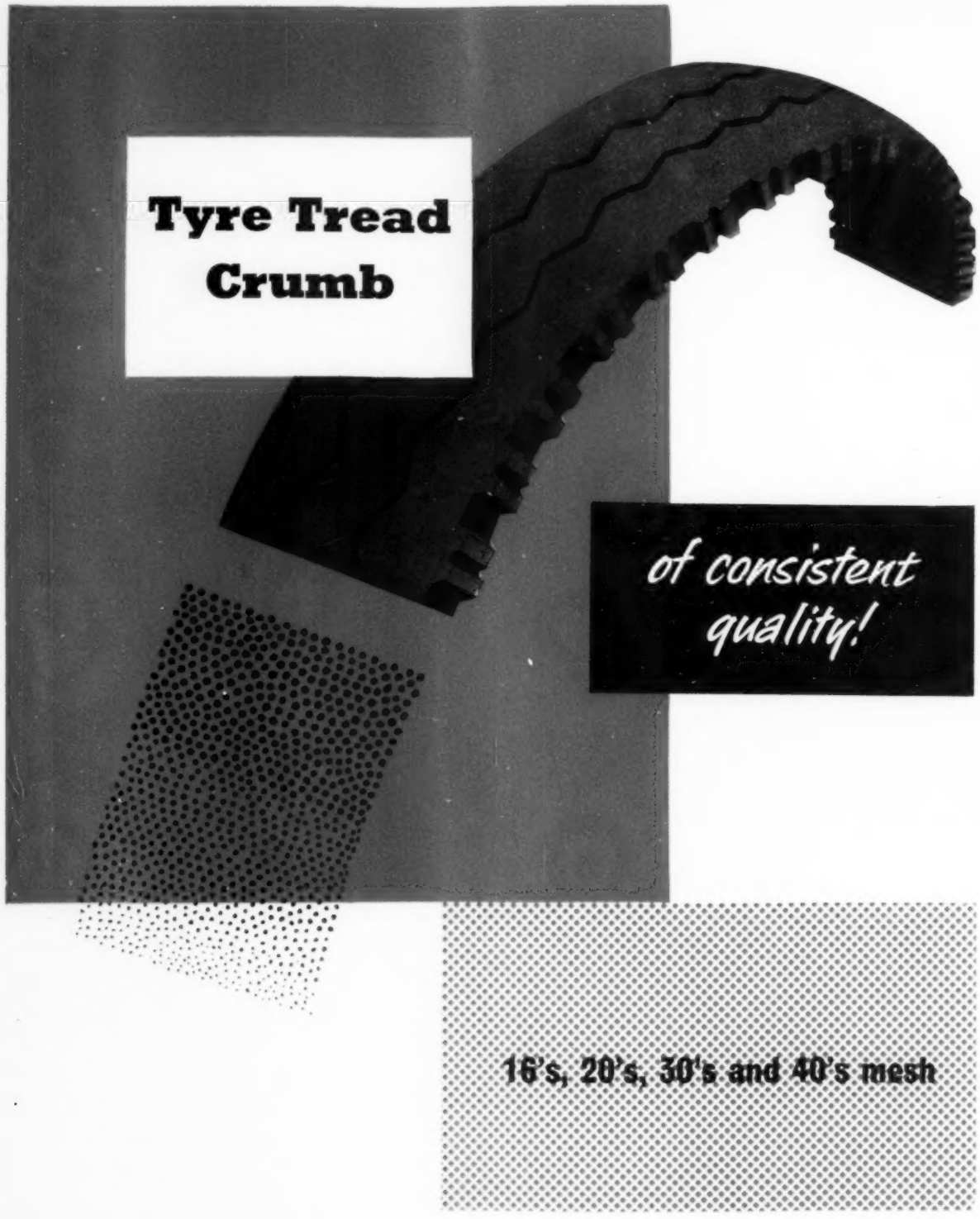
One or two creative calenderers

P.S. Don't forget that rather nice lab assistant—
in I.C.I. he could be tomorrow's Chairman

Now

Make up the list to several hundred
(mind you put the right letters after their names)
put them out to play in some of the best equip
laboratories in the plastics business, and you
have built up something like the Research and
Technical Service and Development Departm
I.C.I. Plastics Division.

MEANS PROGRESS IN PLASTICS



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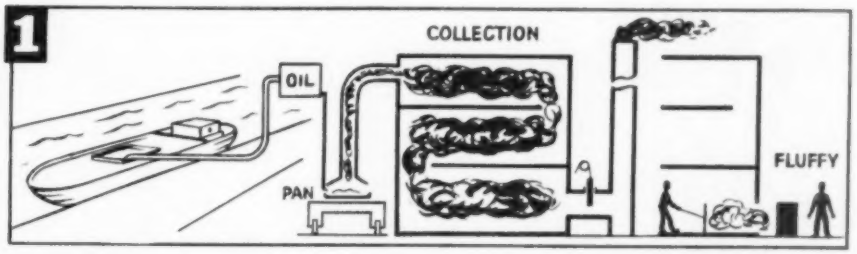
Magecol 888 BEADS

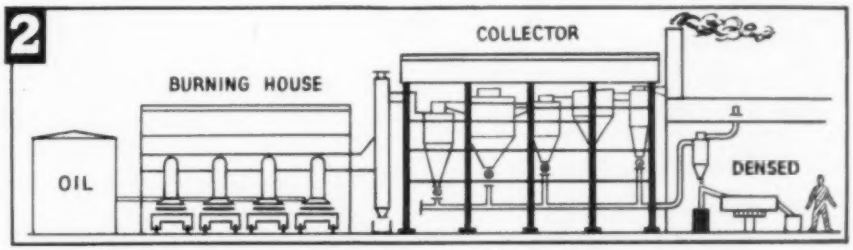
(Manufactured by Columbian-General Blacks Ltd.)

1918-53



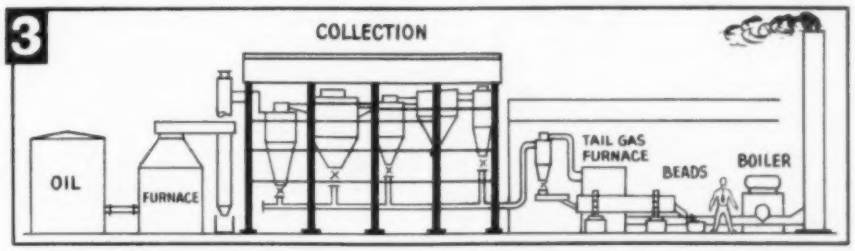
Manufacture began on the site of our present works at Four Ashes in 1918. Coal Tar distillate oils were delivered by canal barge and were burned in a cast-iron pan under a bell-shaped hood. Smoke passed 600 feet through a series of tunnels to be deposited on the floor of a settling chamber. Once each 24 hours the process was halted while men entered the settling chambers to extract and bag the fluffy black in hessian sacks.

1953-57



Early in the '50s the gravity process was abandoned in favour of a modern 8-Pan Collector Unit embodying cyclones and an electrostatic precipitator. Pneumatic Conveyors now carried the product which was, at this point, available as a densed or fluffy powder.

1957



The installation of a single, large furnace, with a stainless steel collection unit, now saves valuable space and labour and gives the precise control over air, oil and temperature necessary for the unvarying quality of our product. Tests in rubber compounds and electron microscope studies prove that the product possesses its traditional virtues and is now in a completely clean-to-handle and grit-free form.

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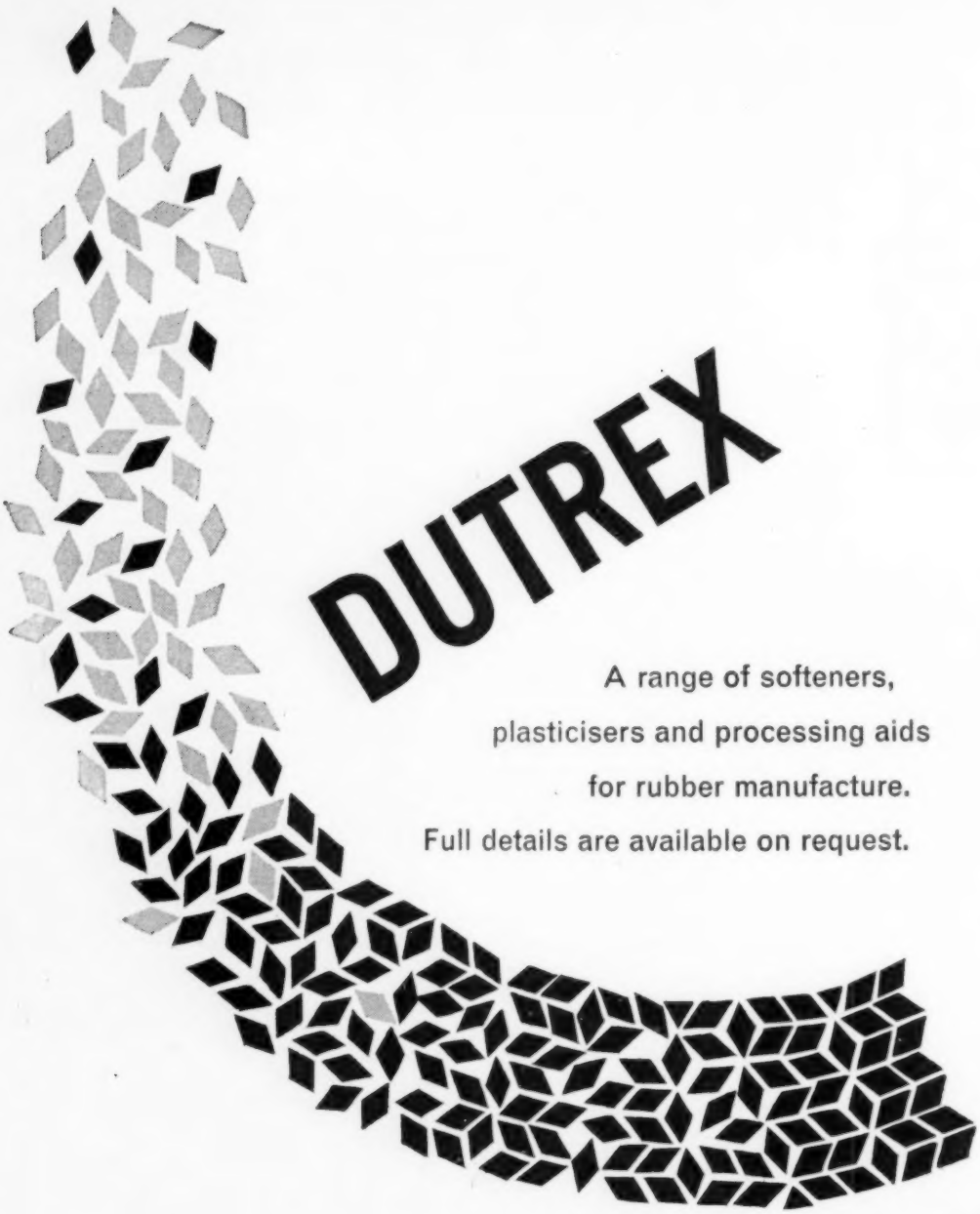

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cut production costs

cut curing time

cut physical effort

cut mould costs

WITH

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Herbert Vulcanising Presses are single and two-daylight electric toggle presses designed for the *really* economical manufacture of technical rubber goods such as shoe soles, heels, bottle stoppers, gasket rings, solid tyres and many other items. They effect great reductions in production costs and enormous savings in physical effort.

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BP.R.9

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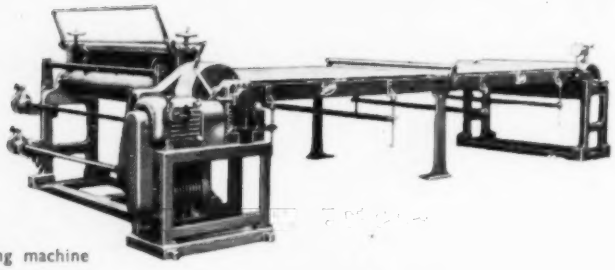
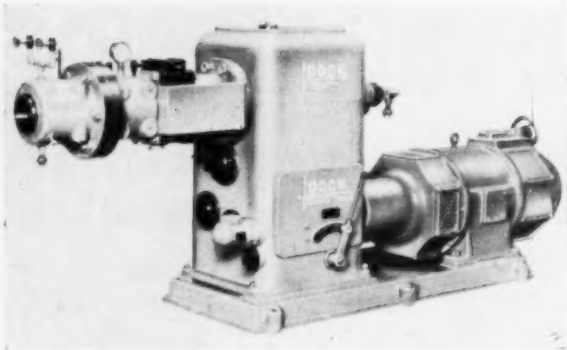
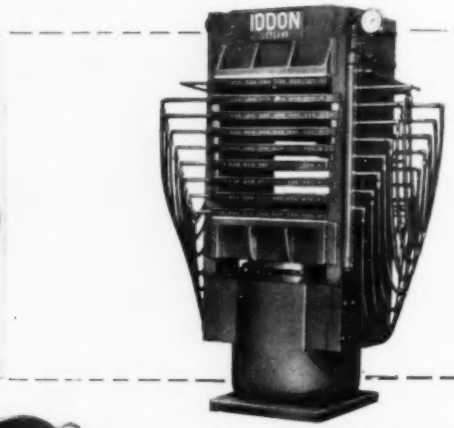


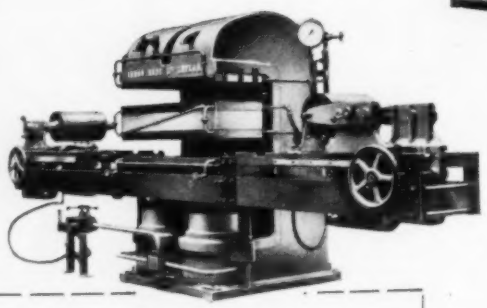
B.Z.12. Spreading machine with variable speed drive unit.



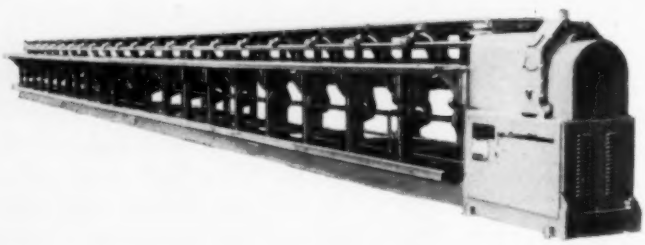
B.Y.7. Type X.L. Extruding Machine. V/S motor drive through 3-speed gear box, roller bed cylinder and straight-way diehead for rubber extrusion.



B.X.8. 48" sq. 8-daylight plate sided Hydraulic Press with 36" dia. ram.



B.L.1. 18" x 48" vee belt Vulcanizing Press fitted with hydraulic stretching gear designed to produce belts of accurate length.



B.X.10. Air operated hose building and wrapping machine with reversible four-speed drive unit.

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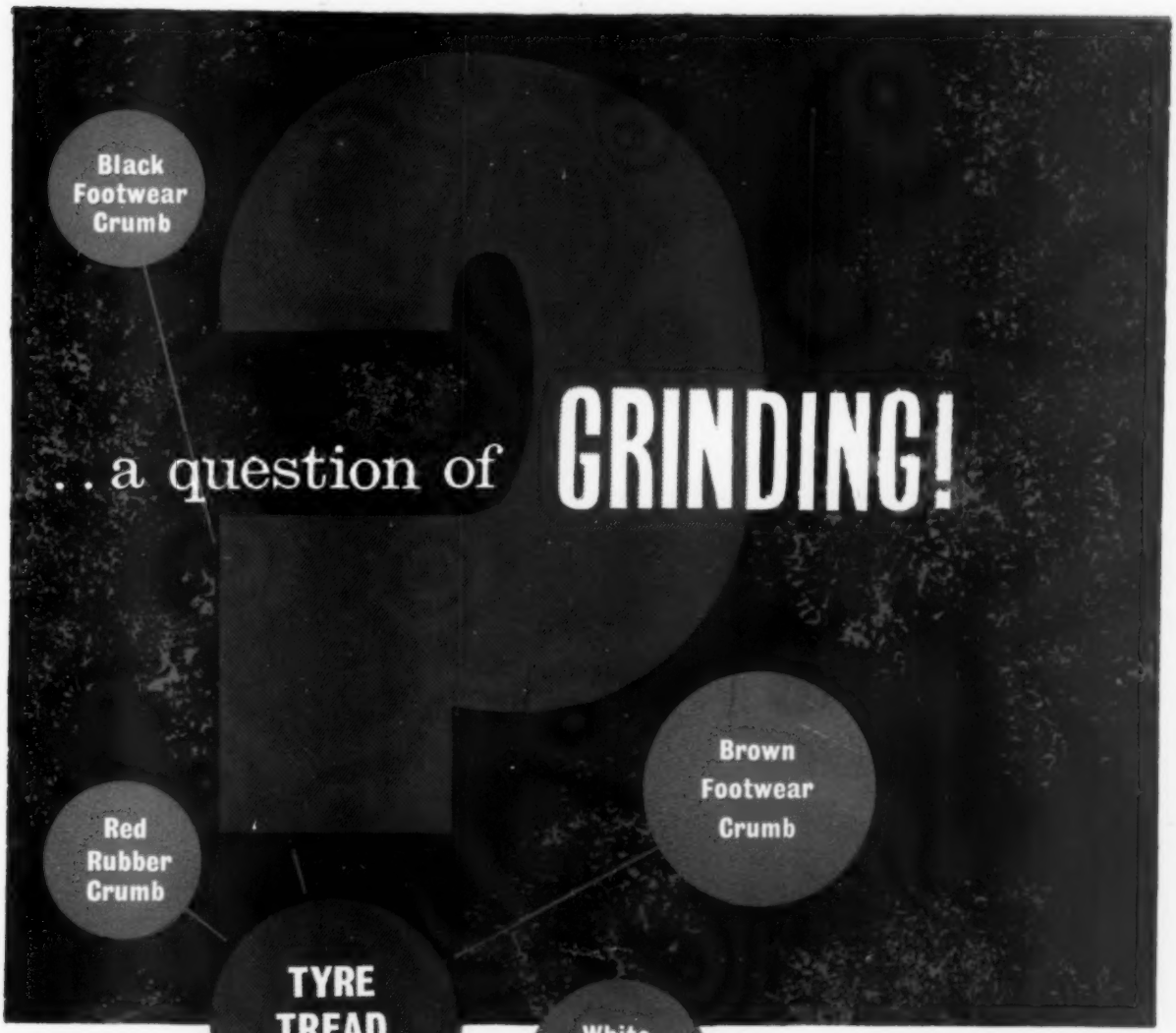

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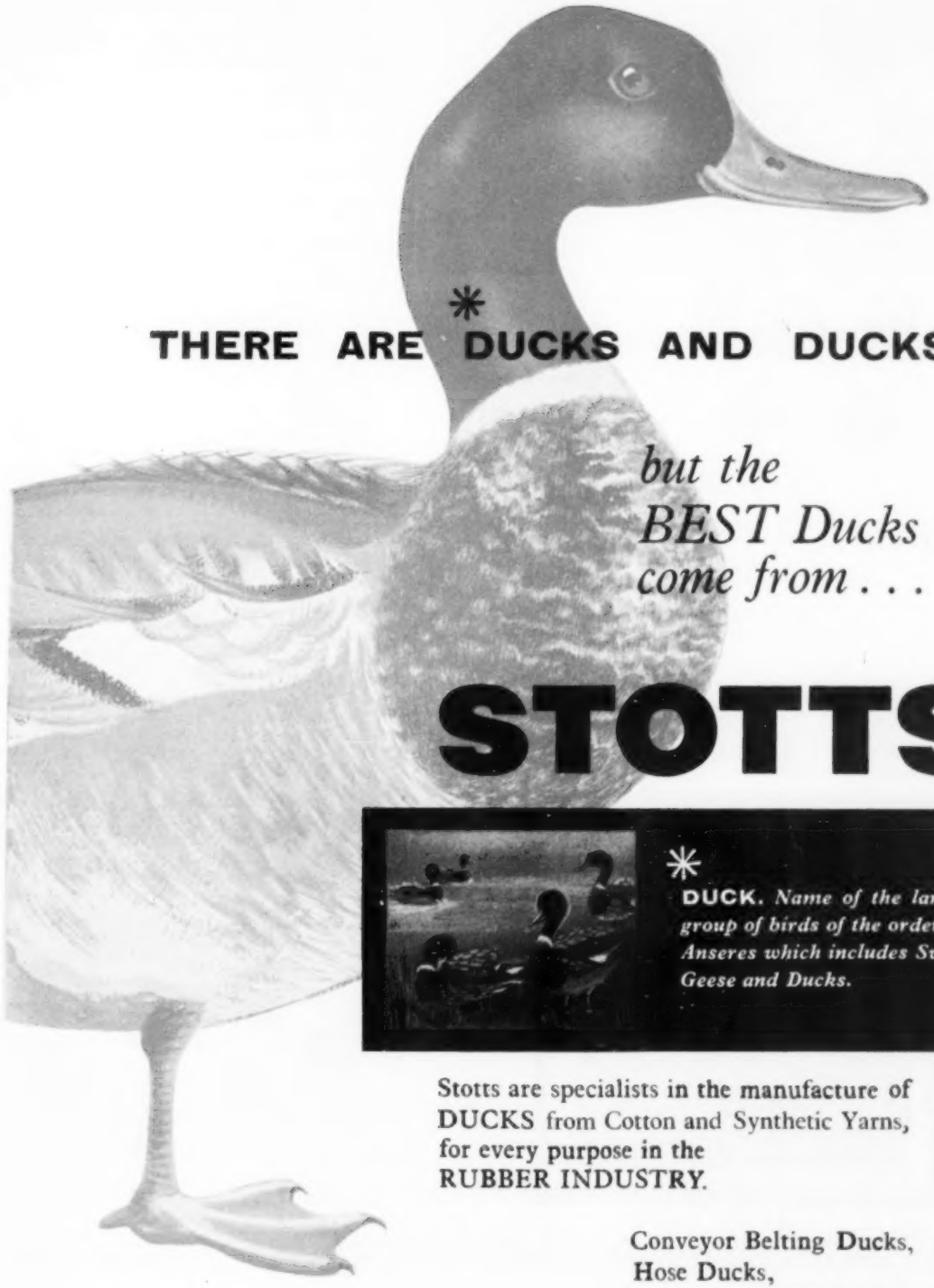

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but the BEST Ducks come from . . .

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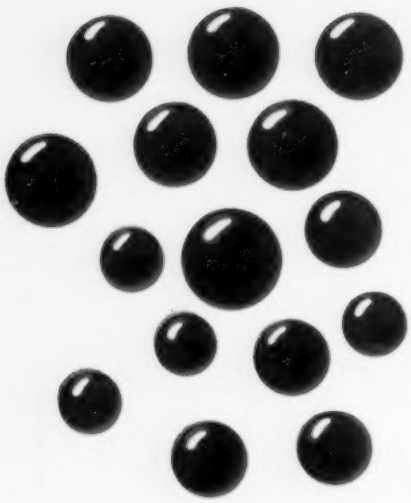

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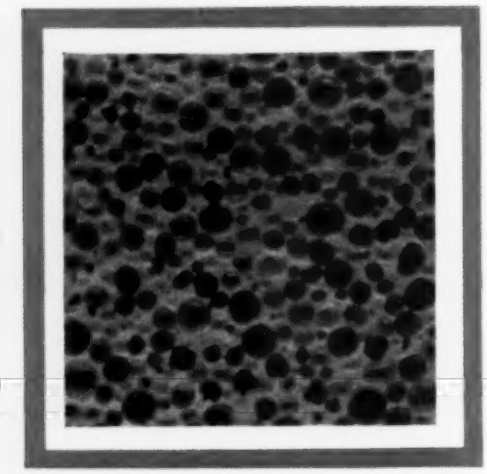
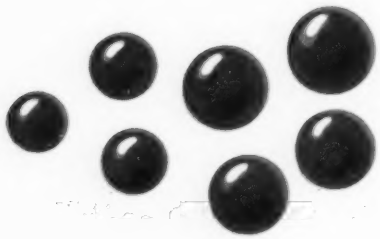


ANCABLO A



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RUBBER and PLASTICS WEEKLY

Formerly 'Rubber Journal and International Plastics'

Volume 141 IN ITS 78th YEAR No. 18

October 28 1961

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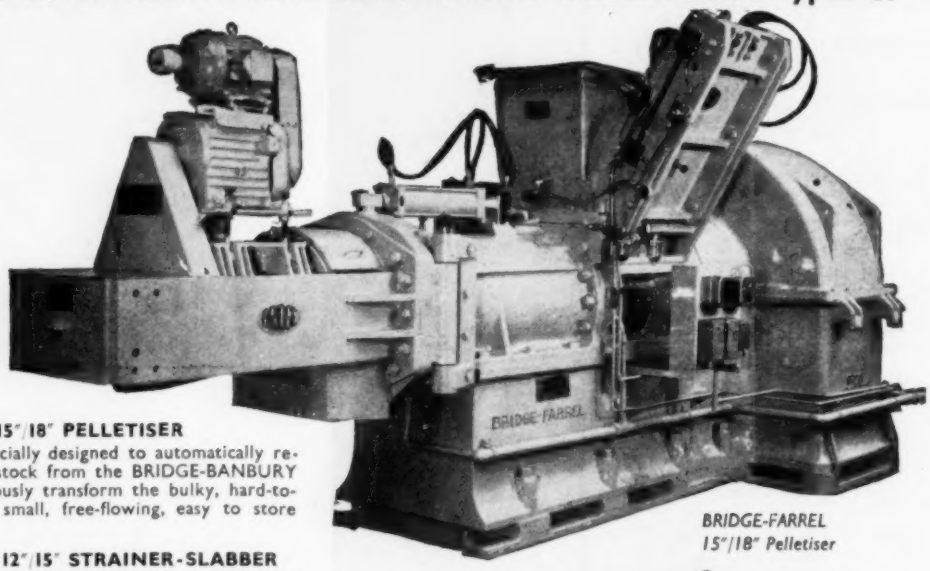

BRIDGE-FARREL 15"/18" Pelletiser

BRIDGE-FARREL 15"/18" PELLETISER
This extruder is specially designed to automatically receive the processed stock from the BRIDGE-BANBURY MIXER and continuously transform the bulky, hard-to-handle masses into small, free-flowing, easy to store pellets.

BRIDGE-FARREL 12"/15" STRAINER-SLABBER
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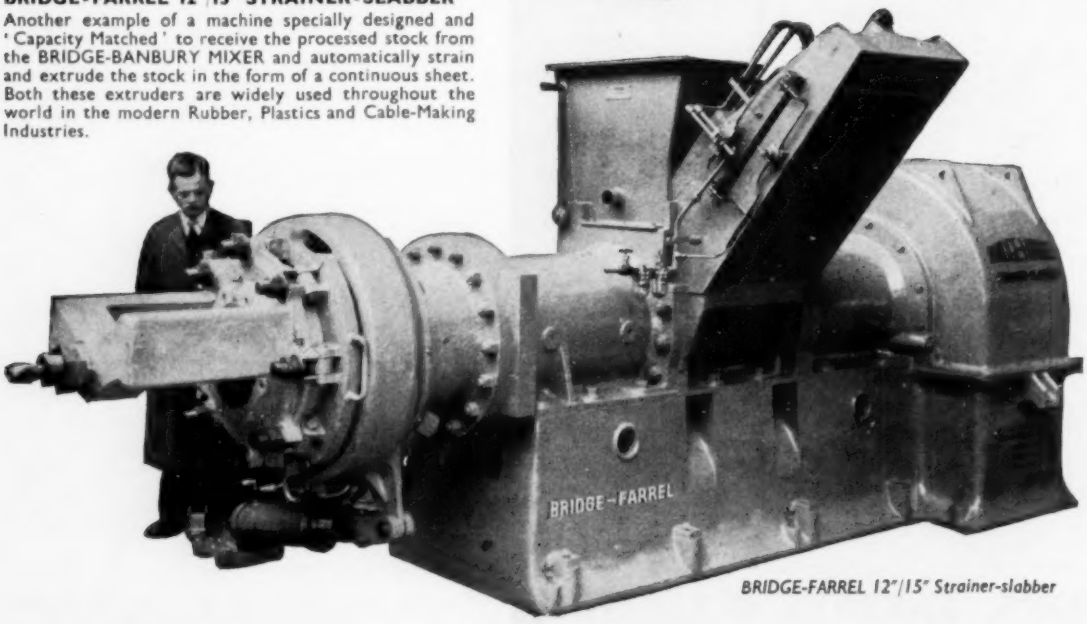

BRIDGE-FARREL 12"/15" Strainer-slabber

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NOTES of the WEEK

Scientific Surplus

STATISTICS on technical training and scientific manpower have suddenly become optimistic. The latest report of the Government's Committee on Scientific Manpower predicts that the supply of scientists and technologists will meet the demands from industries and other bodies by 1965. After this there should be what has almost come to be regarded as a contradiction in terms—a surplus of scientists.

This may seem satisfactory. But although industry's demands will be met in quantity, will they be the people that industry wants? It is time, we feel, for a long hard look at this country's higher educational system. Too little of it is any sort of a preparation for the life that the student will lead when he leaves college. To take one example: the rigid specialization into 'science or arts'. On the one hand we complain about a split in our culture, and yet we do all we can by specialization to propagate it. It would certainly be a good thing for industry if a proportion of students took a mixed science and arts course. The intake of arts graduates into polymer firms, large and small, is going up. But in an increasingly technical atmosphere they tend to be at a disadvantage and often have to be given specialized training. 'Liberally' educated graduates, with a firm grounding in science, could enter into the commercial side of the company with much more confidence—and be much more useful than graduates with an intimate knowledge of Beowulf but not even a smattering of organic chemistry.

A Beautiful Substance

MANY millions of words have been written on plastics in sales brochures and catalogues, but these were some of the first: 'The material is hard as ivory, transparent or opaque, of any degree of flexibility, and is also waterproof; may be of the most brilliant colours, can be used in the solid, plastic or fluid state, may be worked in dies and pressure, as metals, may be cast or used as a coating to a great variety of substances; can be spread or worked in similar manner to india rubber, and has stood exposure to the atmosphere for years without change or decomposition. And by the system of ornamentation patented by Henry Parkes in 1861, the most perfect imitation of tortoise-shell, woods, and an endless variety of effects can be produced'.

This is how Alexander Parkes described his 'beautiful substance' Parkesine in the catalogue of London's International Exhibition of 1862. Parkesine, which the inventor made by mixing nitrocellulose with camphor and alcohol, has been described as the first synthetic plastic, and the forerunner of celluloid. Because of this 1962 has been selected as the centenary year for plastics, and this week a joint committee of the Plastics Institute and the British Plastics Federation was set up to organize a number of events to commemorate it (page 715).

In the conventionally ordered, natural world of the Victorians Parkesine appears to have been regarded as having little more than trinket value. But Parkes himself seemed to recognize its importance, although he could have scarcely foretold the thousands of products spreading from a vast industry which were to come after his 'Case of Illustrations' which contained 'Medallions, Salvers, Hollow Ware, Tubes, Buttons, Combs, Knife Handles, Pierced and Fret Works, etc . . .'

The steady growth of the rubber industry has meant that it has a well documented history. The explosive growth of the plastics industry has led to it leaving its history behind. The work carried out by the Plastics Institute and British Plastics Federation in arranging an extensive programme for the Parkesine centenary will enable the industry—in a sense—to catch up with itself.

Incentives

FINANCIAL incentive schemes are regarded as effective means of increasing co-operation between workers and management. Yet the evidence suggests that their effectiveness is limited and that they are likely to be less widely applied as productive techniques improve.

A new DSIR booklet* discusses the evidence that is available from studies of the working of incentive schemes over a number of years. It shows that 33% of British workers are paid according to some kind of financial incentive, which is an increase of 4% since 1939. This relatively slow rate of progress may be interpreted as showing that increasing mechanization is making incentive schemes redundant—or it may be that they have already been applied to most of the tasks for which they are appropriate.

* 'Money for Effort' by Tom Lupton—No. 11 in the Problems of Progress in Industry series. Published for the Department of Scientific and Industrial Research by HMSO.

NEWS *Briefs*

GOODRICH-GULF SBR AND DIENE MOVES—MORE MICHELIN CAPITAL—CEYLON SUBSIDY SCHEME PLASTICS FROM COKE — TORONTO EXHIBITION

●**Japan** — Showa Denko KK of Tokyo, and Tennessee Eastman Co., a division of Eastman Kodak, have announced that Showa Denko will be licensed to produce polypropylene in Japan using an Eastman process. The agreement is subject to approval by the Japanese government. Showa Denko is one of the largest integrated chemical complexes in Japan having many subsidiaries and extensive research and technical service laboratories. Within the organization a wide field of diversified products are manufactured which are supplied to the domestic and overseas markets.

●**Western Germany** — Western Nigeria is trying to improve the quality of its rubber and is also attempting to increase production, Chief S. L. Akintola, Prime Minister of Western Nigeria, told executives of the West German Rubber Using Industries Association in Frankfurt. Heinz A. Fritz, director of the Association, said later: 'We made it quite plain to Chief Akintola that the world — and that includes West Germany — can take far more natural rubber from the producing countries, as long as both price and quality are right. . . . We recommended Chief Akintola to join the International Rubber Study Group, and he replied that initial steps in that direction had already been taken'.

●**United States** — Goodrich - Gulf Chemicals Inc. has granted a licence to manufacture, use and sell its *cis*-polybutadiene and *cis*-polyisoprene synthetic rubbers to the Japanese firm of Ube Industries Ltd. Goodrich-Gulf has previously licensed the Polymer Corp. Ltd., Sarnia, Ontario, and the Shell Chemical Co. Ltd. (UK). The company has also announced that an agreement has been drawn up to exchange technical information on these rubbers with Chemische Werke Hüls of Marl, West Germany. Goodrich-Gulf Chemicals is owned jointly by the B. F. Goodrich Co. and the Gulf Oil Corp.

●**France** — Compagnie Financiere Michelin, the investment holding company of the French rubber company Michelin, with headquarters in Switzerland, plans to increase its capital to 352m. Swiss francs from the present 300m. An announcement said this would be done by stepping up the nominal value of shares from 1,500 to 1,600 francs by incorporating reserves at the rate of 13 francs per share, by paying up in cash 87 francs per share, and by the issue of 20,000 new registered shares of 1,600 francs each against cash.

●**Ceylon** — The Government's scheme for subsidizing the replanting of rubber land with high-yielding varieties is to be continued until 1968. The scheme, originally devised in 1959, was to cover 200,000 acres by 1962. Of this 160,000 acres have been replanted. The scheme is costing the Government 20m. rupees a year, of which 15m. comes from China by way of economic aid. The total area under rubber in Ceylon is about 700,000 acres, annual production being estimated at 100,000 tons.

●**Russia** — Construction of the Avdeyev coke and chemical plant, claimed to become the largest of its kind in Europe, has started near Stalino, in the Donetz basin, USSR. About 70 chemicals will be produced, including intermediate products for plastics and other synthetics. It is planned to set up research institutes of organic chemistry, thermal power engineering and chemistry of coal in the vicinity of the new giant combine.

●**United States** — Goodrich-Gulf Chemicals Inc. has begun an 8% expansion of synthetic rubber production capacity at its Institute, West Virginia, plant. The expansion chiefly will provide for more production of light-coloured non-staining types of cold SBR but will also increase flexibility in production of all types of the rubber. The increase in tonnage was not disclosed nor was the cost of the work indicated but the company said 'provision had been made for this expansion when the styrene-butadiene rubber lines were converted from hot to cold production after the plant was purchased in 1956. Therefore, engineering and construction costs will be moderate'.

●**Indonesia** — More than 50,000 acres of Indonesian rubber land have been replanted with new high-yielding seedlings so far this year, the Agricultural Department reports. The 1961 replanting target for estates of 36,000 acres had already been reached, the Department said, and more than 14,000 acres had been replanted by smallholders.

— 560

British Xylonite CPA Link

JOINT COMPANY FORMED FOR PRINTED PVC

A JOINTLY-OWNED company, Plastics Printers Ltd., has been formed by the British Xylonite Co. Ltd. and Calico Printers Association Ltd.

An announcement was made on Wednesday (October 25) by the CPA chairman, Roger M. Lee, at the company's annual meeting. Mr Lee said that the new company would specialize, initially, in the production of printed flexible pvc for a wide range of applications.

Commission Processing Basis

A statement issued by the two companies says that 'with the experience of BX Plastics Ltd. (a member of the British Xylonite Group) in the production of the basic vinyl sheeting, and the expertise of CPA, in printing on all types of fabrics and textiles, the new company offers interesting possibilities to users of printed plastics and its facilities will be available on a commission processing basis somewhat similar to that already operated in the textile trade by the CPA'.

The statement points out that new outlets for printed flexible vinyl are being opened up continually, ranging from pvc surfaced panels for use in building and interior decoration to laminates of vinyl to metals such as the John Summers product Stelvetite. This consists of Velbex flexible vinyl laminated to steel; from it are constructed household products such as washing machines and refrigerators.

Stelvetite is also used for many larger structural uses and the statement adds that in these, as in the more domestic applications, the new company will offer an advisory service on design and colour schemes.

Other industries which, it is thought, will be interested in the facilities offered by Plastics Printers Ltd., include the car and furniture trades. 'Particular attention', the statement says, 'is being given to the collection of designs from all over the world to enable British manufacturers to meet the fierce competition in export markets'.

Plastics Printers Ltd. will be equipped to produce multi-coloured printing on flexible vinyl sheeting, both unsupported and laminated to various other materials, man-made and natural.

British Xylonite is owned by the Distillers Co. Ltd. The Calico Printers Association is said to be the world's largest textile printing organization.

Wire Insulation Plasticizers

The West German firm, Chemische Werke Witten, GmbH, of Witten, is producing Witamol 190 (di-isotridecyl phthalate). With its extremely low volatility at higher temperatures, this is an effective 105°C. pvc wire insulation plasticizer.

The product is being marketed in the UK by Chemicals Trading Co. Ltd., Cree House, 18-20 Creechurch Lane, London, E.C.3.

International Particle Board Meeting

THE seventh meeting of the General Assembly of the European Federation of Associations of Particle Board Manufacturers was held in London on October 24 and 25 at the offices of the British Plastics Federation, of which the British Wood Chipboard and Particle Board Manufacturers recently formed a group.

Formed in Zurich

The European Federation was formed in Zurich in 1958, its founder-members being the associations of particle board manufacturers in France, Germany, Austria and Switzerland. Objects of the association, which now has a membership drawn from 14 countries, are to foster good relations in the industry in the various countries involved, to solve economical and technical problems of the wood chipboard industry, to increase its use, and to work together in approaching various governments and professional organizations.

Among subjects discussed at this year's meeting were results of market research in various countries, customs duty classification, a dictionary of technical terms in the particle board industry, and suggestions for study by the technical committee. The chairman was the president of the European Federation, M. de Longeaux (France). The UK delegate was F. C. Lynam (Airscrew Co. and Jicwood Ltd., Weybridge), chairman of the British Plastics Federation Group.

Previous meetings of the General Assembly have been held in Baden-Baden, Paris, Rome, Vienna, Hamburg and Amsterdam.

PI NEWS

Plastics: 1862-1962

A JOINT committee of the Plastics Institute and the British Plastics Federation has been set up to organize a number of events in connexion with a Centenary of Plastics, 1862-1962.

1962 has been chosen because 100 years earlier Alexander Parkes showed his 'beautiful substance' Parkesine — the forerunner of celluloid — at the London Exhibition of 1862.

The events include: a banquet in Guildhall in June 1962; the preparation of historical records on tape and possibly on film; the publication of a book giving the story of plastics and containing a detailed history of celluloid; supplements in the national press on the history of plastics; specially designed stickers for letters and for office franking machines; contributions in the national and technical press and on radio and television; open days in firms in the plastics industry; and special meetings and lectures throughout the centenary year culminating in Interplas 1963, the International Plastics Exhibition, to be held at Olympia, June 12-22.

PI Examination 1961

There were 188 candidates in the 1961 Plastics Institute examination. Most candidates sat for about six out of a possible total of 11 papers and there were 352 passes in individual papers and 249 failures. Sixteen candidates completed the educational requirements for Associateship, three the requirements for Graduateship and 35 obtained the Diploma.

Young People's Lecture

The annual Young People's Lecture will be held on January 5 1962 at 2.30 p.m. at the Institution of Electrical Engineers, when Professor M. Stacey, PhD, BSc, FRS, will talk on 'Nature's Plastics'. Tickets may be obtained from the Institute.

Fellows, Associates and Graduates

The Council of the Institute has made the following awards:

Fellows: J. Babbs and V. H. Wentworth.

Associates: V. W. J. Ashmead, C. J. Barker, R. W. Burke, J. V. Dahinten, A. J. Kennedy-Ripon, R. W. Little, F. C. Morley, A. Rutherford, J. Rys-Sikora, B. Tildesley, R. Whisson, R. E. Williams, P. V. Wilson and R. Woods.

Graduates: R. Brinson, I. A. Campbell, T. G. Freud, G. D. Heath, G. D. Hudson, K. A. May, R. Mather, P. R. Matthews, A. C. Morris and E. W. Ridlington.

£400,000 Film-base Plant

OPENED AT BEXFORD'S BRANTHAM FACTORY

A NEW machine, 'the most modern in the world', built at a cost of some £400,000 for the manufacture of photographic film base, and for the making of plastics films for commercial use, was set in motion last Friday (October 20), by the Rt. Hon. John Hare, MP, until recently Minister of Labour.

The Rt. Hon. John Hare, MP (*extreme right*), **inspecting the finished film at Bexford's Brantham plant**

The machine is at the Brantham factory of Bexford Ltd. Bexford is jointly owned by BX Plastics Ltd. (part of the Distillers Co. Ltd.) and Ilford Ltd., and is said to be the only one in the UK and in the Commonwealth making film base.

Photographic film base is an essential raw material used in the manufacture of all types of photographic and X-ray film. Its production is a difficult technical operation and is carried out in only a few works in the world.

Before the war all film base was imported either from the USA or from Belgium, involving heavy foreign expenditure. To curb this, the Bexford undertaking was started about 10 years ago at the suggestion of the President of the Board of Trade.

Since its operation began the Bexford undertaking has been responsible for saving foreign exchange — chiefly dollars — to the extent of more than £20m. On X-ray film supplied to the National Health Service alone it has saved more than £5m. of foreign exchange.

The firm is now said to supply the whole of the film base requirements of the UK-owned section of the photographic industry, and has considerable direct exports — even to USA.

The film base casting plant at Bexford operates 24hr. a day, seven days a week. The capital construction of the factory is estimated to have been in the region of £3m. About 500 workers are employed.

I.C.I. Crude Oil Contract for Kellogg

Kellogg International Co. has been awarded the contract for building I.C.I.'s crude oil distillation plant on the north bank of the Tees, a project which was announced earlier this year.

The plant, which may be working in 1963, will provide some of the naphtha fraction used for ethylene from which polythene is produced at Wilton.

It is expected that the plant will have a through-put of 1m. tons of crude a year.

SRT 2

The latest issue of *Soviet Rubber Technology* (No. 2, Vol. 20) includes articles on: improving the quality and extending the range of butadiene-styrene rubbers, the modification of rosin for preparing emulsifying agents for the production of butadiene-styrene rubbers, and on certain features of the use of nylon-6 fabrics and the properties of rubber-fabric materials based on them.

Soviet Rubber Technology is produced with the support of the Department of Scientific and Industrial Research, and in collaboration with Maclaren and Sons Ltd., by the Rubber and Plastics Research Association of Great Britain, Shawbury, Shrewsbury, Shropshire.

Johnson Matthey

Johnson, Matthey and Co. Ltd. has acquired the majority of the shares of the leading Belgian precious metal company, Pauwels Frères SA.

Philblack Celebration

A LUNCHEON to mark the 10th anniversary of the opening of Philblack Ltd.'s carbon black plant at Avonmouth, was held on October 20 at the May Fair Hotel, London.

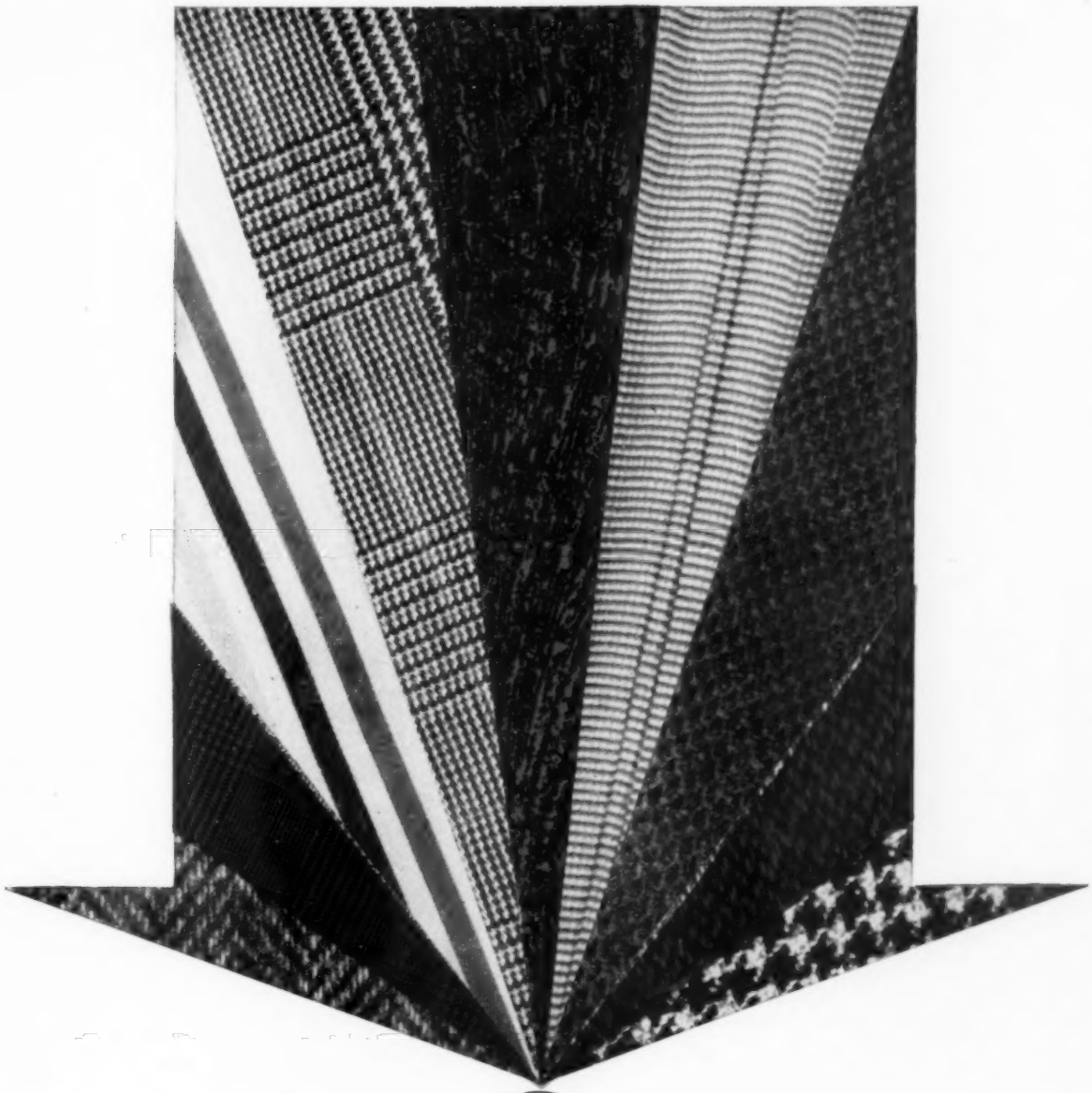
Lt.-Col. C. P. Dawnay, chairman of Philblack Ltd., in proposing the toast of 'The guests', welcomed the Lord Mayor of London, Sir Bernard Waley-Cohen, and some 220 other guests — drawn chiefly from the rubber industry — including Lord Bruce of Melbourne and Sir G. Edward Beharrell.

He said that he felt that the company was justified on looking back over the past ten years with pride on its achievements mingled with just a tinge of humility at the luck which it undoubtedly had had. The formation of Philblack, he said, was a private venture to save dollars, and over the years an average of at least £1½m. of dollar imports a year had been saved, in addition to which foreign currency had been earned by the building up of a substantial export business, now in excess of £1m. a year.

The Common Market and the erection of several new carbon black plants in Europe and elsewhere must, he said, have an effect on the company's exports. It was too early to estimate how serious the effect might be, but he welcomed the increased competition as in the end it would make those who survived more efficient and venturesome.

Sir Bernard Waley-Cohen, in a brief and witty reply to the toast, complimented Philblack on its contribution to the economy of the country in increasing exports and reducing imports.

An article on Philblack Ltd. appears on page 724.



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PLASTICIZERS FOR PVC — PART 7

The Choice of Plasticizer

CONTINUALLY GROWING FIELD NEEDS CONSTANT STUDY

By W. S. PENN, BSc.

THE physical properties involved were considered in detail in the last article. These included tensile strength, modulus, elongation, softness, cold flex temperature properties and the like. These properties, the tensile characteristics in particular, are far from being all those that are required to indicate the potentialities of a given compound. Other attributes of the compound must also be considered.

These other properties may conveniently be called 'the functional properties' since many of them are concerned directly with the performance of the compound in practice. They are the ability of the plasticizers in the compounds to resist extraction by solvents, water and detergents, to resist volatilization and migration. Cold flex properties and others (already considered) may also be considered as functional properties.

Volatilization

The subject of volatilization may be studied in two ways. First, compounds may be heated and their loss in weight may be determined. Second, they may be aged at elevated temperatures for varying periods and the changes in physical properties measured.

In the case of weight loss, Table 1 gives some figures for the various groups compared with DOP and TTP. The compounds contained 50phr plasticizer and 2.0phr white lead.

TABLE 1
WEIGHT LOSS OF PVC COMPOUNDS 24HR. AT 100°C., 0.012IN. SHEET

Group	*Plasticizer*	*Weight loss, %*
1	DOP	6.4
2	TTP	3.3
4A	PPA	0.42
4A	PPS	0.40
4B	PPA/MCA	1.52
4C	PPA/MHA	0.99
5A	Epoxidized oil	0.23
	Epoxidized ester	0.52

All the polymeric plasticizers are better than the monomeric, even better than TTP, the best of the common monomerics. The very high molecular weight (and viscosity) plasticizers PPA and PPS are virtually non-volatile and should always be used where the very highest heat resistance is important. Generally as the processing properties of the plasticizers are improved (*i.e.* proceeding to Groups 4B and C) the volatility increases. The real exceptions are the epoxidized compounds, the exceptional resistance of which is remarkable and cannot be explained by their molecular weights which are comparatively low.

A further indication of volatility over a longer period is given in Fig. 1.

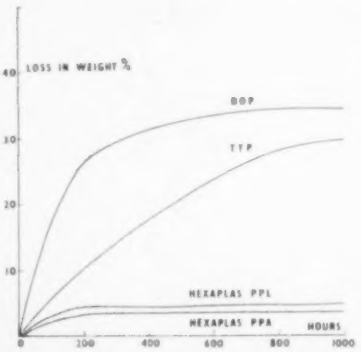

Fig. 1. Volatilization of polymeric and other plasticizers

The larger rapid increases in the losses for monomeric compounds is obvious. The losses for the polymeric plasticizers, on the other hand, soon level off at a relatively low value. Presumably the losses are due to the volatility of the lower molecular weight fractions of the polymeric plasticizers.

The second method of studying the effect of heat ageing is commonly used in the cable industry. The changes in physical properties over a period of time at regular intervals are measured. Elongation is the usual criterion as being quite a sensitive property and one which indicates when a compound is no longer useable dynamically. A figure of 50% elongation is usually taken as the minimum value. Some typical figures are given in Table 2.

The compounds concerned contained 50phr plasticizer and 2phr white lead. The difference in ageing resistance is clear but can be varied greatly by the stabilizer system. Even so, the ageing properties of monomeric plasticized compounds over 100°C. are not good.

Extraction by Solvents

One of the important reasons for using polymeric plasticizers is because of their resistance to extraction by solvents. Some figures for various plasticizers are given in Table 3, which gives the % weight loss of 0.010in. thick film after immersion for 24hr. at 50°C., except the HA petrol which was 2hr. at 25°C.

TABLE 3
RESISTANCE OF VARIOUS PLASTICIZERS TO SOLVENTS

	Highly aromatic petrol	*Mineral oil*	*Olive oil*
PPA ..	1.5	0.5	0.9
PPA/MCA ..	14.2	8.6	10.7
Epoxidized oil	16.1	12.1	10.9
TTP ..	18.4	7.9	9.1
DOP ..	26.2	19.8	19.3

The compounds in Table 3 contain 50phr plasticizer. It may be seen quite clearly from the table that all plasticizers are superior to DOP and that TTP, as a monomeric plasticizer, is remarkably similar to the 'intermediate' polymeric range. The PPA (and similar plasticizers) are undoubtedly the best from the point of view of resistance to extraction and should always be used if highly aromatic materials are involved. The other polymeric plasticizers are only intermediate in properties but are still well superior to such plasticizers as DOP, DOS and the like.

I.C.I. Ltd. has given some useful comparative data for its products. These are reproduced in Table 4; the work was carried out on sheets 0.010in. thick after immersion for ten days at 20°C. and then drying for 24hr. at 20°C. The compound contained 50phr plasticizer.

These results confirm those given

TABLE 2
EFFECT OF HEAT ON ELONGATION (*Days at* 120°C.)

Plasticizer	*Initial Elongation*	*7 Days Elongation*	*7 Days % Retained*	*14 Days Elongation*	*14 Days % Retained*	*28 Days Elongation*	*28 Days % Retained*
PPA ..	300	290	96.8	295	98.2	270	90.0
PPA/MCA ..	310	275	88.8	270	87.0	240	77.3
DOP ..	350	160	45.7	70	20.0	—	—
TTP ..	310	180	58.1	90	29.0	—	—

Furniture by Walter Nugent Designs, Oakville, Ontario, Canada

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3 Foam Physical Properties: highest load carrying capacity of any latex foam rubber; with adequate processing control, properties are not sensitive to minor compounding variations; good age resistance; flex properties equivalent to natural latex foam.

TYPICAL LATEX PROPERTIES

Former designation	XPRD-860
Ratio of butadiene/styrene	70/30
Latex total solids (%)	65
pH	10.5
Viscosity (Brookfield LV, No. 3 spindle)	
—at 12 rpm. (poises)	18
—at 30 rpm. (poises)	11
Free styrene (%)	0.03
Formaldehyde preservative (ppm.)	300
Mechanical stability	good
Storage stability	very good
Coagulum on 80 mesh screen (% of dry weight)	0.04
Average particle size (Angstrom units)	1200
Mooney viscosity of contained polymer (ML/4)	150
Density of dry latex solids (g./cc.)	0.950

TYPICAL COMPOUND PROPERTIES

(for recipe based on 100% Polysar Latex 723 and 10 parts clay filler) After curing (25 minutes in steam 212°F) and drying.

Density	lb./cu. ft.	g/cc	Compression resistance, RMA (lb/50 sq. inches at 25% deflection)
Low	4.5	.072	12.5
Medium	6.5	.104	32.5
High	8.5	.136	61.0

Density	lb./cu. ft.	g/cc	Tensile Strength (p.s.i.)
Low	4.5	.072	6.0
Medium	6.5	.104	8.8
High	8.5	.136	13.4

Elongation at Break (%)	190
Compression Set (%)	6.8
Volume Shrinkage (%)	13.7

Aged in Air (% change after 22 hours at 212°F)	
	Compression Resistance + 9
	Tensile Strength −13
	Elongation at Break −31

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previously. In particular, Hexaplas PPA is considerably superior to all other plasticizers, and TTP is excellent, except for resistance to high octane aircraft fuel. The intermediate plasticizers are again intermediate in properties. The same sort of properties are obtained with the equivalent Paraplex plasticizers.

The resistance of Paraplex G25 (probably based on PPS) is outstanding and is superior to PPA. It is undoubtedly the sebacate radical which accounts for this as illustrated by the excellent result of DOS. Perhaps the only conclusion to be drawn from these and other results presented is that detailed tests should be carried out on specific compounds before they are put into use.

TABLE 4
EXTRACTION DATA ON I.C.I. POLYMERIC PLASTICIZERS
(% *Loss of weight*)

	Hexaplas PPA	*Hexaplas PPL*	*DOP*	*TTP*
High-octane aircraft fuel, RDE F 75	+0.4	−18	−23	−25
Light petroleum, SBP 2	1.8	−11	−19	−17
Kerosene	+0.2	−3.7	−17	−1.4
Olive oil	−0.4	−3.0	−13.4	−2.0
Transformer oil	+0.1	−2.8	−4.6	−1.0

Water, Soap and Detergents

The resistance of pvc compounds to extraction by water, soap and detergents is becoming of great consequence. With the large amount of vinyl upholstery and clothes (including such important applications as baby pants) in use, it is clear that the materials will be repeatedly washed. In addition, many pvc compounds need to be water resistant and these include car covers, rainwear, tarpaulins and the like. Some typical results are given in Table 5, showing the % loss in weight of samples 0.010in. thick after 24hr. immersion at 50°C.

TABLE 5

	Distilled water	1% *Soap solution*	1% *Detergent solution*
PPA	1.2	4.7	3.8
PPA/MCA	1.0	8.0	5.2
Epoxidized oil	0.1	1.3	0.6
TTP	+0.2	8.0	5.1
DOP	0.3	7.9	3.9

The results in Table 5 are of the greatest interest. In particular the difference in behaviour in distilled water and soap solutions should be carefully noted. Not only does the addition of soap cause a large increase in the amount of extraction but a large relative difference. The TTP and DOP results are particularly good examples of this.

The results show how unpredictable technological results can sometimes be. It would perhaps have been expected that the PPA would, as with the solvents, have given the best results. However, the only really good result in soap and detergent is given by the epoxidized oil. It may be noted that the resistance to water of all compounds is good.

Some commercial results for Rohm and Haas Co. Paraplex plasticizers are given in Table 6, showing the % loss in weight of 0.010in. thick samples immersed in 1% soap solution for 24hr. at 90°C. The plasticizer contents were adjusted to give a Shore hardness of 77.

The results in Tables 5 and 6 were obtained by extraction at elevated temperatures. The same order of results might well be expected at room temperature but this does not follow as indicated by the results in Table 7 given by A. Boake, Roberts and Co., showing the results of immersion on compounds containing 60phr plasticizer, test pieces 0.05in. thick immersed 24hr. at 20°C.

TABLE 6
RESISTANCE TO EXTRACTION OF PARAPLEX PLASTICIZERS

Plasticizer	% *Plasticizer*	% *Loss in weight*
Paraplex G25	40.5	0.3
Paraplex G40	45.0	12.0
Paraplex G50	39.5	8.4
Paraplex G60	37.0	1.0
DOS	35.0	1.0
DOP	35.0	7.8

TABLE 7
EXTRACTION OF ABRAC 'A' BY SOLUTIONS

	Distilled water	1% *Detergent solution*
Abrac 'A'	0.12	0.80
PPS	0.22	0.33
DOP	0.15	0.64
TXP	0.12	0.37

Migration

An important characteristic of vinyl compounds is their ability or otherwise to resist migration into other materials with which they are in contact. 'Marring resistance' is one important aspect of this subject. Sometimes, normally with monomeric plasticizers, migration can be so great as to cause softening, tack development and even surface cracking.

The materials usually used in test work for migration resistance determination are cellulose nitrate, which is particularly sensitive, polystyrene and rubber. A consideration of migration in polystyrene is particularly important since so much of it is now used in electrical applications. Among the rubber/pvc interface problems, which include cable applications, there is an interesting feature. This is in pressure sensitive insulating tape where rubber-based adhesives are supported by a pvc film. There must, of course, be intimate contact of the tape which the adhesive, and plasticizer migration can destroy this.

Some typical results are given in Table 8.

TABLE 8
MIGRATION RESISTANCE OF PLASTICIZERS

	Cellulose nitrate	*Rubber*	*Polythene*
PPS	2.7	2.9	0.1
PPA	2.2	1.0	0.34
PPS/MCA	9.1	0	0.3
PPA/MCA	10.7	2.5	0.7
PPA/MHA	6.4	0.7	0.1
Epoxidized oil	9.1	1.3	0.25
DOP	14.1	11.0	2.2

The degree of migration will clearly depend on (a) the type of plasticizer and (b) the type of material with which the pvc is in contact. These points are clearly brought out in Table 8. The cellulose nitrate is attacked by most materials, the rubber not so much and the polythene little, polystyrene being similar. In the case of the plasticizers, the Group 4A types are always best, the 5A types are good except in contact with cellulose nitrate and the monomeric plasticizers are poor.

Food Applications

Most plasticizers can readily be tested in the laboratory to see if they are satisfactory for specific applications. This is not normally possible where plasticizers are required for compounds likely to be in contact with food products, particularly in the packaging industry. Competent authorities normally study such properties and this has been done in the UK by the British Plastics Federation and in the USA by the FDA. A list of their recommendations is given in Table 9.

TABLE 9
FDA APPROVED PLASTICIZERS FOR FOOD PACKAGING

Group 1
- Di-ethyl phthalate
- Di-iso-octyl phthalate (foods of high water content only)
- Di-octyl phthalate (foods of high water content only)

Group 2
- Diphenyl-2-ethyl hexyl phosphate

Group 3
- Di-butyl sebacate
- Di-iso-butyl adipate

Group 5
- Acetyl tri-butyl citrate
- p-tert-butyl phenyl salicylate
- Butyl stearate
- Butyl phthalyl butyl glycolate
- Glycerol mono-oleate
- Tri-stearyl citrate
- Epoxidized soya bean oil (iodine No. max. 6 and Oxirane oxygen min. 6%)

The plasticizers in Group 5 (and there are quite a number of others) illustrate the wide variety of available plasticizers which could be used.

Choice of Plasticizers

The present series of articles will have indicated the wide range of plasticizers which are available. In making a choice from them, therefore, it is essential not just to know their individual characteristics, but to understand their relationship to each other. The classification proposed in previous articles should be used for this purpose.

In making a choice of plasticizer, great care should be taken to use the correct properties for guidance. For example, tensile strength considerations are rarely of any value in a choice of plasticizer but rather cold flex and tear properties, modulus or hardness, electrical properties, 'drape', resistance to migration and the like, are features which should be considered.

In the sections which follow, an effort is made to indicate the way in which plasticizers should be chosen. Detailed properties have already been considered so that it is only necessary to indicate a suitable scheme. Although all companies will not follow this exactly, it does represent the sort of procedure which is normally followed.

Common Plasticizers

First of all it is proposed to consider the most popular plasticizers and how to choose between them. Consideration will then be given to when these should be replaced by less common types. The most popular plasticizers are given under headings below.

Group 1
- Di-octyl phthalate (DOP)
- Di-butyl phthalate (DBP)
- Di-iso-octyl phthalate (DIOP)
- Phthalate 79

Group 2
- Tri-tolyl phosphate (TTP)
- Tri-xylyl phosphate (TXP)

Group 3
- Di-butyl sebacate (DBS)

Group 4
- Polypropylene adipate (PPA)

Group 5
- Chlorinated Paraffin Wax (Cereclor 42)
- Epoxidized Vegetable Oil (Abrac 'A')

In the above list, DOP is by far the most common plasticizer, followed by TTP.

The main distinctions between the groups and the choice between them are given below:

Group 1

The phthalates are the general purpose plasticizers. They give good all-round properties such as good physicals, reasonable low temperature resistance and good electrical properties.

They would not be used alone where (a) very low temperature resistance is important, (b) where flame resistance is of importance. With these two exceptions, DOP should be the first choice of plasticizer.

Group 2

The phosphates are often used as general purpose plasticizers, TTP being quite common. They have poor low temperature properties, however, and are better used where non-flammability is of importance.

Group 3

The sebacates (and adipates to a lesser extent) are used where very low temperature properties are important. They are expensive and consequently are rarely used alone but often in 50:50 mixtures with DOP. DBS is very popular for this purpose.

Group 4

These are the polymeric plasticizers which are acquiring greater prominence as the demand for higher and higher temperature compounds arises. The materials are therefore used for their low volatility and low extractability when exposed to heat or solvents. Although PPA has been given above, the polymeric plasticizers are normally sold under trade names, details of which have already been given.

Group 5

Group 5A includes the epoxidized oil, the example here being Abrac 'A', a proprietary material sold by A. Boake Roberts and Co. Ltd. Others have already been given. The products are used in place of polymeric plasticizers, since, although not polymeric, they have relatively high molecular weight. They are much easier than PPA to incorporate into compounds and have much better low temperature properties.

Group 5B includes the plasticizer extenders. Cereclor 42 (an I.C.I. product) is quite popular, but, as with the others in the group, cannot be used alone. It must be used in limited proportions with primary plasticizers or else 'sweating' will occur. The materials are generally used to reduce cost, although certain electrical properties can be improved.

It will often be possible to choose a plasticizer purely on the above principles. Sooner or later, however, the reason for the choice will have to be augmented with practical tests.

Method of Procedure

In any compounding investigation, the following is the general procedure which should be followed:

(a) Choose the best polymer for the end use.
(b) Choose the most obvious and standard plasticizer.
(c) Choose the best stabilizer system, bearing in mind that some plasticizers prefer special stabilizer systems.
(d) Where appropriate choose a lubricant.
(e) Carry out plasticizer variations, keeping everything else the same.
(f) Where required, and after the plasticizers have been chosen, carry out filler investigations, bearing in mind that the level of plasticizer might have to be changed for certain fillers.
(g) Add final ingredients — usually dyes or pigments to achieve the right shade.
(h) Physical tests on all of these compounds will be carried out, and the best one chosen, but it should be kept in mind that processing requirements may influence compounding. A factory trial is the only ultimate criterion of the suitability of a compound.

Such procedures as the above are carried out extensively in laboratories. Standard materials are usually used in the first place but an open mind should be kept for new combinations of materials and new compounding ingredients, particularly stabilizers, plasticizers and fillers.

Properties to be Considered

In the previous section under (h), it was suggested that physical tests should be carried out on all the compounds in the investigation. The types of tests to be carried out are indicated below but it should be stressed, however, that the final choice will be one of individual preference, the way an observer sees and interprets the results himself. In addition, the results achieved from one laboratory or factory to another will not necessarily be the same, so that the decision made by the technologist concerned must be his own.

To make an effective choice of plasticizer, a range of properties must be considered. These are discussed below. Naturally they need not all be determined, depending on the end usage of the product, but some should be evaluated for a desirable general background. These properties are considered first.

It is normal in the first instance to carry out physical tests. Although the tensile strength is of no great significance, it has to be determined to obtain modulus at 100% elongation and elongation at break, both of which give a clue to the flexibility of the compound.

Other physical properties of this nature include tear tests (by any of the standard methods) and BS softness. The tear test is a particularly valuable indication of the robustness of the compound and should be

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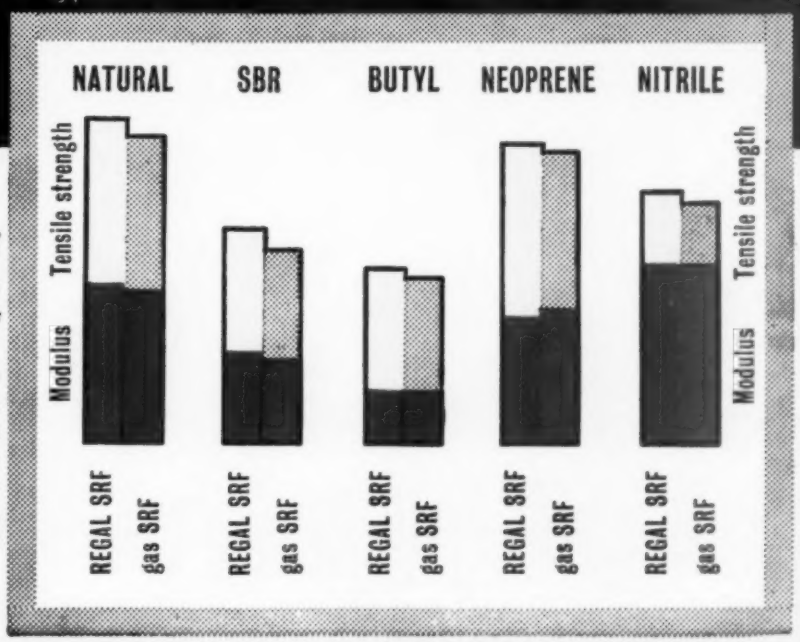

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carried out if there are likely to be any severe operational conditions.

A test carried out with nearly all plasticizers is volatility. This is quite simple and involves heating a strip of compound containing the plasticizer for a period of time at an elevated temperature and weighing before and after. A period of 24 hours at 85°C. is quite common.

It is also quite common to carry out cold flex temperature tests (BS 2571:1955) to determine behaviour at low temperatures. Many compounds, not primarily designed for low temperature work (raincoats for example) are frequently used at fairly low temperatures. It never does any harm therefore to carry out this test.

An important test for most pvc compounds is resistance to extraction by solvents. This simply involves determining the loss in weight of the test specimen in the medium concerned after a certain time and at a certain temperature. The medium will depend on the end use.

A number of tests are more applicable to specific industries. In the cable industry, for example, electrical properties are of importance (usually volume resistivity) and another important test is 'hot deformation'. This is resistance to deformation of the pvc at elevated temperatures. In quite a number of industries the 'marring' properties of the pvc are important. This is the degree to which the pvc affects a surface with which it comes into contact. Non-marring pvc compositions are important. Abrasion resistance can be of importance and a special abrasion test was devised by the NCB when the changeover to pvc conveyor belts was contemplated.

There are many other tests which can be applied but the most important have been mentioned. Tests for *processing* properties, as distinct from *application* properties may also be carried out. These may include flow characteristics (determined in extruders for example) but perhaps most important is stability. Although this is normally only regarded as applicable to stabilizer investigations, there can be interactions between plasticizers and stabilizers. It is therefore advisable to carry out stabilization tests even in plasticizer investigations.

Rapid Guide

It is sometimes difficult with the wide range of available plasticizers to appreciate where each one should be used. To assist in this matter, the Table 10 has been designed to give a picture of plasticizers at a glance. The table in no way replaces the necessity for detailed studies but should act as a quick guide.

Continued on page 738

TABLE 10

RAPID GUIDE TO CHOICE OF PLASTICIZER

Plasticizer	*Where to use*	*Where not to use*
DOP (Di-Octyl Phthalate)	1. Most common compounds 2. Electrical compounds 3. Some food applications	1. Very high- and low-temperature applications 2. Where fire resistance is of importance
DIOP (Di-Iso-Octyl Phthalate)	1. As cheaper partial or complete replacement for DOP in all applications	1. As 1 and 2 with DOP 2. Marginally inferior to DOP in electrical, plasticizing and heat-resisting properties
DAP (Phthalate 79)	1. As cheaper replacement for DOP or DIOP	1. Where odour-free compounds are of great importance 2. As 1 and 2 with DOP 3. Marginally inferior to DOP in electrical properties
DBP (Di-Butyl Phthalate)	1. Where great flexibility and compatibility are required	1. Where low volatility and extractability are important
DCP (Di-Capryl Phthalate)	1. A cheap replacement for DOP 2. For good electrical properties	1. Marginally inferior to DOP on heat and light stability 2. Gives slightly stiffer and harder compounds
Di-2-Butoxy ethyl phthalate	1. As a process aid, particularly in calendering compounds	1. Not for inexpensive compounds
DNP (Di-Nonyl Phthalate	1. For partial replacement of TTP in low-temperature applications 2. In high-temp. compounds	1. Not flame resistant
Di-Isodecyl Phthalate	1. For low- and high-temperature applications	1. Not flame resistant
TTP (Tri-Tolyl Phosphate)	1. A general-purpose material 2. Where fire resistance is of importance 3. Where low extraction is important 4. Good for outdoor use 5. Good for mech. applications	1. Has very poor low-temperature properties 2. Not for food applications
TXP (Tri-Xylyl Phosphate)	1. A cheap replacement for TTP 2. A close match in all properties to TTP	1. Gives slightly stiffer compounds than TTP 2. As for 1 and 2 with TTP
TOP (Tri-Octyl Phosphate) and TIOP (Tri-Iso-Octyl Phosphate)	1. Where flame resistance and reasonable low-temperature properties are required	1. Not good processing
DBS (Di-Butyl Sebacate)	1. For very low temperature applications 2. For food applications 3. Where good 'drape' required	1. Only fair volatility 2. Not for cheap compounds 3. Not flame-resistant
DOS (Di-Octyl Sebacate)	1. Better volatility than DBS 2. Wherever DBS is used 3. Best for cables at low temps.	1. Not for cheap compounds 2. Not flame resistant
DOA (Di-Octyl Adipate)	1. For very low-temperature applications 2. To give good 'hand' and 'drape'	1. Not for high heat resistance 2. Not where flame resistance matters
DIOA (Di-Iso-Octyl Adipate)	1. A cheap version of DOA	1. As DOA 2. Not for elect. applications
Polypropylene adipate, sebacate and similar polymeric plasticizers (PPA, PPS, etc.)	1. At high temperatures 2. Where freedom from migration and extraction are important	1. For good 'drape,' etc. 2. In pastes 3. Where good processing properties are essential 4. At low temperatures
Epoxidized oils and esters	1. Similar properties to polymeric plasticizers, although resistance to extraction and heat slightly inferior 2. Better low-temperature properties than PPA, PPS, etc. 3. Where extra stability required 4. Reasonable processing properties	1. At very low temperatures
Chlorinated paraffin waxes	1. For cheapening 2. For non-inflammable compounds 3. In most compounds including electricals	1. Not as sole plasticizer 2. Not at very high temperatures
Chlorinated paraffins	1. Cheaper edition of chlorinated paraffin wax	1. As 1 and 2 in section on polypropylene adipate, sebacate, etc. 2. In electrical products 3. Under conditions where chlorine likely to be developed
Hydrocarbons, modified hydrocarbons, petroleum residues	1. Very cheap products for limited use	1. In small quantities only

PLASTICS MACHINERY DEVELOPMENTS

Manumold Injection Moulding Presses

PLASTICS AID PLASTICS PRODUCTION

By JOHN SHEARING

FLORIN Ltd. manufactures a range of relatively small horizontal bench injection moulding presses called the Manumold series. Apart from the obvious interest of the presses themselves, one of the components employed in their manufacture indicates how plastics themselves can be used in the manufacture of plastics machinery.

The presses are designed specifically for use with sliding moulds that have horizontal split faces and edge injection. Some hard wearing surface was therefore required which was corrosion resistant, would not damage the moulds and was silent in use.

The obvious answer to such a problem was some form of laminated plastics and the manufacturers chose Permaply, which has proved to be very satisfactory.

Permaply Work Tops

The work tops for the Manumold presses are supplied by Venesta Plywood Ltd. and measure 25in. x 7½in. x ¾in. They are fabricated from Permaply and are mounted on rubber buffers.

The Permaply supports the mould as it slides from the vice stage to the ejection station. The surface is lubricated with light mineral oil which helps the transfer and at the same time keeps the operation virtually silent. Such a low noise level is of tremendous value where batteries of the machines are being used and contrasts sharply to the noise level that would occur if metal surfaces were used. This is further emphasized by the fact that the moulds weigh between 10lb. and 50lb. each and that the transfer operation takes place four or five times a minute.

So far these work tops have been in use on the machines for over three years without need of replacement. Even when the surface does become damaged it can easily be restored by the use of abrasive papers or, in the last resort, the material can be turned over and the under-surface used.

New Manumold Model

A number of the Manumold machines are hand operated in many respects. However, a new model known as the All-hydraulic Manumold is for hydraulic operation of the clamping device as well as injection.

The standard machines are of a unit type of construction which is an important advantage. It means, for example, that a conventional machine can be converted to hydraulic operation at a low cost.

In addition, interchangeable units are also available to increase the shot capacity of the machine from 1oz. to 2oz. and injection pressures up to 20,000psi.

Heating Facilities

There are two standard plunger diameters, namely ¾in. and 1in., although a larger plunger of 1⅛in. diameter can be supplied for special purposes. The cylinder is made from Nitralloy and has the advantage of small mass and therefore low thermal capacity. Although this is not ideal for low power consumption, it does mean that suitable energy regulators can be employed. A valuable feature of this advanced machine, even in the general purpose range, is the use of two torpedoes in series.

The machine is normally heated with two 300-watt band type resistance heaters, each one fitted with a plug-in electrical connexion. The special requirements of nylon have also been catered for in that the two heater bands have been increased to 400-watt and in addition a further heater band of 200-watt capacity has been provided.

There are heating problems associated with the injection moulding of nylon which require special facilities on machines. Such facilities are not often provided on small equipment. However, the Manumold series includes a nylon nozzle which incorporates a patented leak-proof valve. When the plasticizing cylinder is moved forward the valve opens and retraction on completion of the injection cycle causes the valve to close.

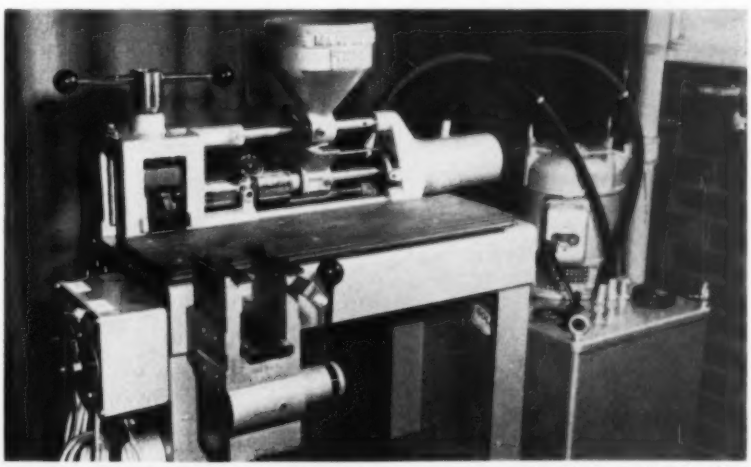
Two other examples of the use of plastics in these machines may be mentioned. In the first place, the hopper lid is formed of acrylic material, and secondly the moulding ejection fixture is a machined casting which is operated by means of a precision ground ram running in nylon bearings.

A detailed specification for the machine is shown in Table 1.

TABLE 1

ALL-HYDRAULIC MACHINE SPECIFICATION

Shot capacity (1in. dia. cyl.): 1 oz.
Shots/hr.: Up to 300, depending on shot weight and mould.
Dry cycle time: 5sec.
Plasticising capacity: 5-7lb.
Hopper capacity: 140 cu. in.
Platen area: 2½in. vice, 12½ sq. in.; 4in. vice, 42 sq. in.
Mould dimensions: 2½in. vice, 2½in. wide x 5in. long x 3-4½in. high.; 4in. vice, 4in. wide x 7in. long x 4-6in. high.
Mould locking force: 16 tons.
Injection pressure (line pressure 1,000psi): ¾in. dia. cylinder, 14,700psi; 1in. dia. cylinder, 8,300psi.
Heating capacity: GP cylinder, 2 x 300 watt; nylon cylinder, 2 x 400 watt, 1 x 200 watt.



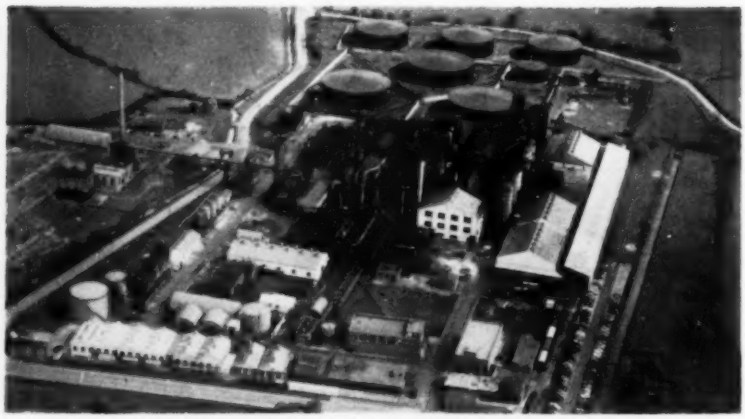
The use of Permaply laminated plastics worktops on this Manumold injection moulding press greatly reduces the operating noise level

Ten Years Production at Avonmouth

PHILBLACK LTD.

PLANT CAPACITY

INCREASED 250%



Aerial view of the Philblack plant at Avonmouth

PIONEER of the oil furnace process for the production of carbon black was the Phillips Petroleum Co. in the United States. That company first produced an oil furnace black — Philblack 'A' (FEF) — in 1943, adding Philblack 'O' (HAF) to the range in 1947.

Today there are two more grades of Philblack available ('I' and 'E', ISAF and SAF blacks) — from American sources and also these four grades plus a fifth (Philblack 'G' GPF) are manufactured in the UK.

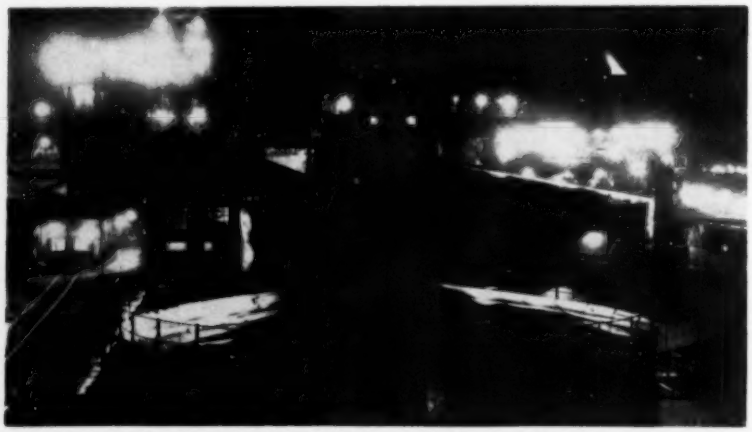
Philblack Ltd. is a British company, financed wholly by British capital and staffed with British personnel, which manufactures carbon black at its plant at Avonmouth, Bristol, under licence from Phillips. The company is believed to be the only independent manufacturer of carbon black in the free world outside the United States.

In July 1948 Philblack Ltd. embarked on the project to establish a modern oil furnace black plant and the scheme came to fruition on May 1 1951, when production of Philblack 'O' began, followed on July 7 by Philblack 'A'. The initial annual capacity of the plant was 30m. lb. of 'O' and 20m. lb. of 'A', but expansion and improvements in the production techniques have increased the figure, which is now almost treble the original.

Although Philblack Ltd. is financially independent of Phillips, the products of the two companies are identical and each benefits from the advantages of research and development work done by the other. In spite of this close and friendly liaison, American and British Philblacks are sold in direct competition with each other and there is no question of one company being given a free hand by the other in any market in the world.

The sole selling agents in the UK for the British products are R. W. Greeff and Co. Ltd., London, who also provide technical service facilities from their laboratories at Newbury, which additionally maintains close liaison with the process control laboratories at Avonmouth.

Users of Philblack, therefore, have the advantage of normal technical service in England backed by the considerable research facilities of the Phillips Petroleum Co. — eighth largest oil company in the United States and the 35th largest industrial corporation in the world.



A night shot of the plant taken from the tank farm. Oil storage capacity for several months production is available

Birthday Celebration

A luncheon to celebrate the inauguration of the plant was held in Bristol on October 11 1951 (*India Rubber Journal*, October 20 1951, 8), when some 250 guests, mostly from the rubber industry, assembled under the chairmanship of the late Sir Leslie Boyce, who was at that time chairman of the company and Lord-Mayor-Elect of London. Sir Leslie said on that occasion that they had now what they believed to be the most up-to-date carbon black plant in existence and he paid tribute to their American friends who had given them full assistance in so many ways and especially to the engineers who had worked tirelessly on the project.

It says a great deal for the company that much of that original plant is still in use — that the immediate vicinity of the Avonmouth factory is still green — and that most of the original employees of Philblack Ltd. who were at that luncheon, are still with the company and were present at a luncheon held in London on October 20 to mark the tenth anniversary of the occasion. (See page 716.)

The company has in that ten years been built up into a healthy concern and the present chairman, Lt.-Col. C. P. Dawnay, has summed up the situation in the following manner:

'The expansion of the company has been made possible by the creating

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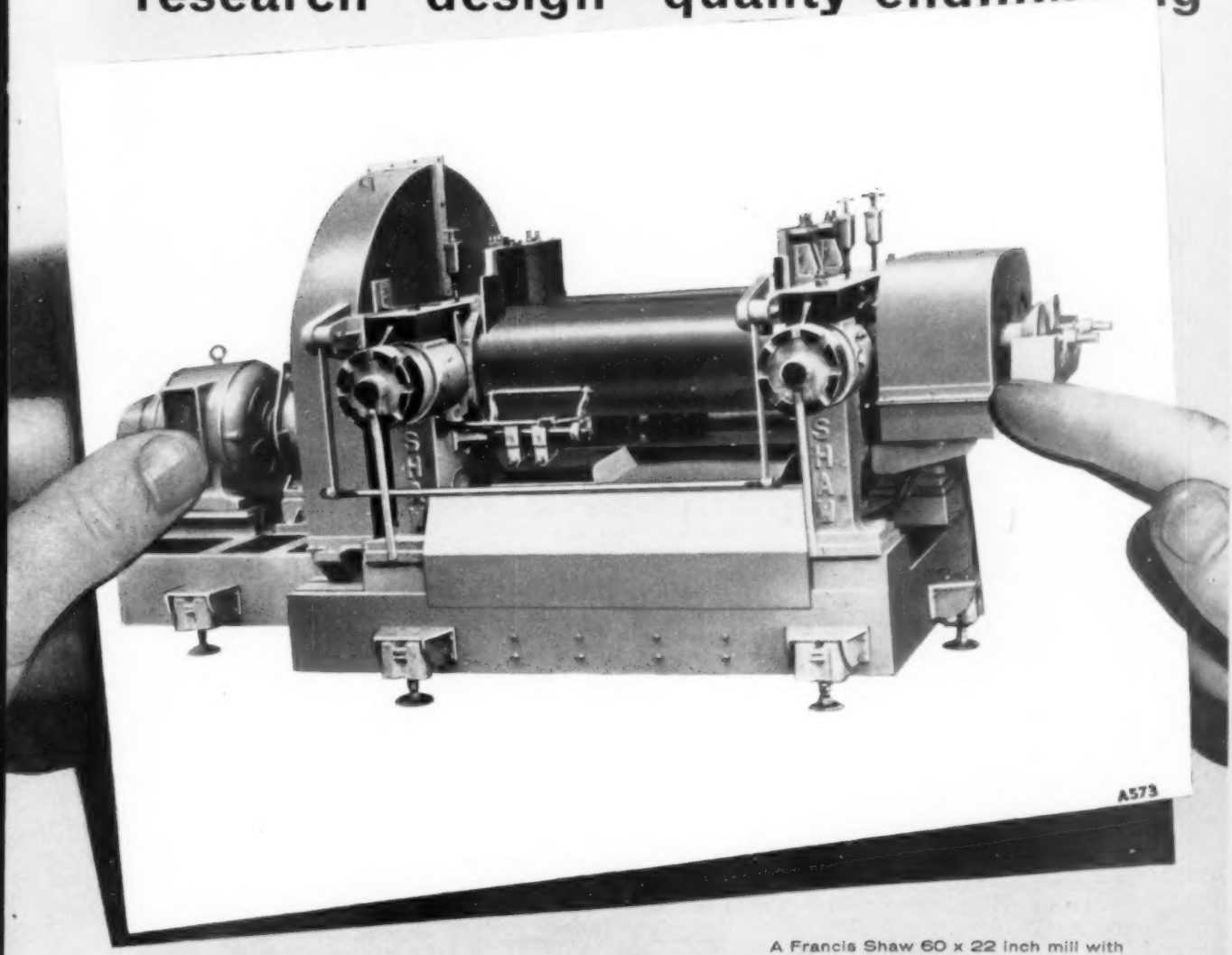
Francis Shaw machine

research · design · quality engineering



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OVERSEAS AGENTS THROUGHOUT THE WORLD P4351

and welding together of a team of young and enthusiastic men. Their team spirit, ably supported by our sales agents at home and abroad, enables us to give that all important service which our customers have the right to expect. We look forward to the future confidently, knowing that our customers' varying needs are appreciated and that we are well equipped and staffed to cater for their manifold requirements'.

With negotiations for the entry of Britain into the European Common Market reaching a crucial stage, this forward thinking attitude of a British firm which is already exporting roughly half of its total output, should serve as an example to be followed by other less progressive manufacturers.

A lorry carrying a pelletized load of Philblack carbon black in front of some of the reactors

The Process

Although to the uninitiated the production of carbon black would seem to be a basically simple matter, it is, in fact, necessary to keep a very close control on the combustion conditions in order to produce a black with the desired rubber compounding properties.

The raw material used at Avonmouth is a special petroleum fraction delivered in tankers to the Avonmouth docks and pumped direct from the ship through a 14in. pipeline nearly four miles long to storage tanks on the plant site. From the main storage tanks the oil is delivered through transfer pumps to small day storage tanks which afford a means of blending feedstocks, checking oil consumption and provide a constant head of pressure for the individual process oil pumps. The only other material required for the process is a steady supply of high pressure air in large volumes. This is provided by triple stage direct coupled air blowers, each powered by a 550hp motor.

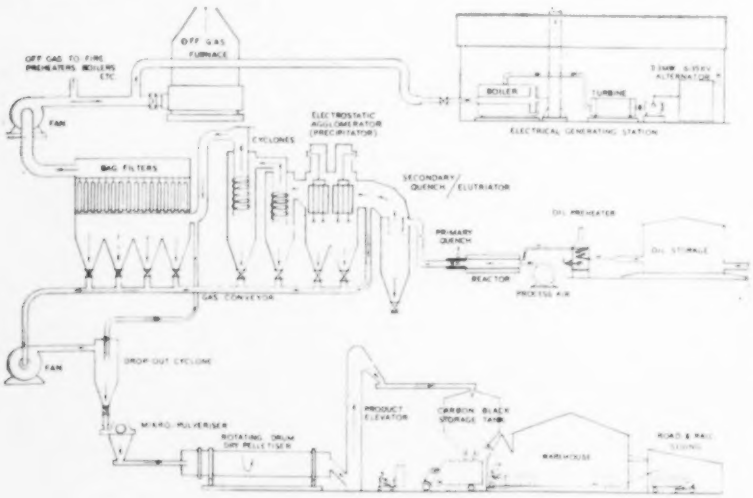
The process oil is fed to pre-heaters where its temperature is raised before admission to the reactors. At this stage a controlled supply of air is admitted and partial combustion of the oil takes place, the heat generated being sufficient to decompose that portion of the oil which is not burned. Carbon black, gaseous by-products and water vapour are formed in the reaction.

The reactors consist of steel cylindrical shells lined with refractory material to withstand the very high temperatures reached during the reaction.

The temperature is controlled within the reactors by the air and oil flows, flow turbulence, and the extent of combustion permitted, all of which have a critical effect, together with the reactor design, on the quality and quantity of black produced.

The combustion products are shock-cooled from approximately 2,900°F. to around 1,100°F. by a primary quench water spray at the outlets of the reactors and then pass along cooling pipes to the main smoke header where the products from all the reactors combine into one stream. Further water cooling takes place in a vertical tower whence the black-laden gases pass to an electrostatic precipitator where agglomeration takes place.

30% of the carbon black yield falls to the base of this unit and a further 65% is removed in the passage of the gases through primary and secondary cyclones. The gases are then passed through bag filters which remove the remaining 5% of black and the filtered gases are passed to an electric generating plant, boilers and pre-heaters, with the surplus being flared through an off-gas furnace stack to atmosphere.



Power Generating Plant

The generator mentioned above is of considerable interest as Philblack Ltd. is probably the first carbon black manufacturer in the world to utilize the waste gases from the process for the generation of electric power.

This presented some difficulties as the calorific value of the gases is so low that combustion is not easy. The furnace and burners were specially designed to overcome these problems and apart from starting up from cold — when supplementary fuel is necessary — run entirely on the waste gases.

Collecting the Product

The carbon black produced at the bases of the precipitators, cyclones and the bag filters is collected and conveyed pneumatically to the Mikropulverizers and thence to the pelleting mills. At this stage the product is in a very fluffy state with a density of approximately 2½lb./cu. ft. The pellet mills consists of long cylin-

drical revolving drums which remove air and gases from the black and roll it into small pellets having a density of about 23lb./cu. ft. The densified product is now in a relatively dust free state which is much easier to handle and due to its increased density, the costs of transport and storage are reduced.

Gravity Fed

From the mills the black is elevated to overhead storage hoppers from which it can be gravity fed to the bag

The generator unit where waste gases of low calorific value are burnt to provide electrical power

filling plant or to bulk containers, ready for delivery to customers either by rail or by road in one of the fleet of vehicles operated under contract to the company from British Road Services.

Apart from the actual production plant the 25-acre site at Avonmouth includes the necessary water treating and steam raising ancillary equipment, and up-to-date electrical and engineering workshops, to ensure a speedy and efficient maintenance service. A further 22 acres of land is available for expansion and still more could be made available.

Quality Control and Research

A comprehensive system of control is maintained to ensure continuity in production standards and that the characteristics of the British Philblacks are the same as their American equivalents.

In addition to this, research and development figures largely in the programmes at the Avonmouth and Newbury laboratories. Regular road testing of tyre treads produced to company specifications is maintained with test vehicles running daily over roads covering a wide area of South-West England. As stated previously, these activities are supplemented by the facilities of the Phillips Petroleum Co. with whom exchange of information on process and application techniques regularly takes place.

IRI NEWS

Whitby for Foundation Lecture

THE 17th IRI foundation lecture will be delivered by one of the most famous figures in the rubber industry, Professor G. Stafford Whitby, in the theatre of the Institution of Electrical Engineers on Monday May 21 1962. Professor Whitby's subject is 'The Biogenesis of Rubber: How the Tree Makes Rubber', and the lecture will be followed by a dinner at the Savoy Hotel.

Professor Whitby, who is professor of rubber chemistry and director of rubber research at the University of Akron, has held several other important posts including that of director of the chemical research laboratory of the Department of Scientific and Industrial Research at Teddington. He was the first recipient of the Colwyn Gold Medal in 1928 and was editor-in-chief of the first authoritative book on synthetic rubber — prepared under the auspices of the Division of Rubber Chemistry, American Chemical Society, and published in 1954.

Rubber and Plastics Symposium

The Institution of the Rubber Industry (Manchester Section) and the Plastics Institute (North-Western Section) in collaboration with Moston College of Further Education (formerly Newton Heath Technical College) are holding a joint symposium on the degradation of high polymers on Friday December 8 1961 at Moston College of Further Education, Ashley Lane, Manchester. Applications for tickets should be made to L. L. Roe, head of Applied Science Department, Newton Heath Technical College, Hague Street, Manchester, 10, not later than November 28.

Non-Technical Conference, 1962

A conference, under the chairmanship of R. Geddes, will be held in the Town Hall, Leamington, on November 16 and 17 1961. The conference title is 'Background to management decision — industry in the early 1960s'.

Four topics will be dealt with as follows: (1) national and economic factors, by H. Wincott; (2) applications of new techniques, by Dr Galloway; (3) attitudes of mind producer and consumer, by N. Fisher and Dr M. Abrahams; (4) tactics of management decision, by Mr Pegler.

AIRI Examination 1961 Pass Lists

J. Acres, R. Bennett, A. T. Blunt, D. A. Booth, D. Brister, S. H. Coulson, J. A. Cousans, M. A. W. Deuchar, J. P. Griffith, E. Hawkins, C. J. Higgins, M. J. Irving, R. H. Jones, L. I. Laud, P. T. Mapp, C. C. Megaw, J. Morris, J. L. Rees, J. P. Russell, A. J. Smith, J. M. Stacey, T. A. Sudlow, J. Sweaney, B. G. Watkins, I. M. Whate, D. Windle, A. J. Young.

Prizewinners: 1st, A. J. Young; 2nd, D. Brister.

Passed Technical Papers but not Language Test: J. Kenyon, K. March.

Languages Pass List

French

G. Butland, J. E. Diamond, H. M. Dunford, F. J. Eaton, D. A. Fletcher, A. Lee, A. D. Logan, D. C. Pryce, K. J. Rimmer, R. Stone.

German

R. D. Baker, H. N. Bien, H. F. A. Capsey, P. Chaffin, R. Cole, D. C. Coulthard, P. A. Crozier, J. Hunter, A. J. Huskisson, K. A. Leach, C. A. Maston, A. A. McNeish, H. B. Milsom, J. O'Connell, G. H. Schuler, G. F. C. Telling.

LIRI Examination

D. O. Asemota, J. Ashmore, J. S. Aungier, B. J. Bryer, N. L. Challinor, J. L. Collins, D. Cook, R. Cormack, S. Das, K. T. Dawson, T. L. Driver, L. B. Evans, K. Exley, C. E. Feakins, C. D. Garside, H. Gilbert, E. G. Gill, P. A. Greenway, A. D. Griffiths, C. E. Gudgin, G. Harrison, J. D. Hertz, T. Hickson, A. Hoolve, N-DG. Huyen, A. R. James, I. F. Johnson, D. S. Keiff, K. A. Leach, J. Lorrison, H. J. Luckett, G. Makin, R. McGee, J. I. Meardon, G. J. Midgley, P. S. Morris, H. M. Nicklin, N. E. Odam, S. H. Ong, S. Orme, R. J. Ottewell, K. J. Palmer, J. Parker, J. C. Perkins, F. G. Pickering, B. Ryall, G. S. Slack, D. Smith, A. Southworth, M. Stalker, K. A. Stonehouse, A. J. Sutton, A. T. Thompson, D. W. Vaughan, R. W. Warrington, S. Webb, P. Weinberger, M. H. Williams, R. Wilson, H. Winstanley, E. C. F. Wood.

Prizewinners: 1st, J. I. Meadon; 2, S. Orme.

International Diploma Scheme

Germany

W. Thüman, K. Favreau, P-B. Hertel, H. Sobota, A. Baune, W. Himmel, E. Leiber, D. Bietke, D. Brichzin, W. Zdenek, W. Braatz, K. E. Benseler, H. Scholz, P. Lange, J. Molina Farré, E. Roddiger, K. Weijz.

Spain

F. V. Aragó, J. C. Torrell.

Sweden

B. G. Gustafsson.

Long Service Membership

The following have been elected Long Service Members: A. F. Baillie, F. H. Bunce, P. W. Howard, B. W. Lacey, E. E. Quinton, E. Rhodes, H. W. Tunstall, F. W. Warren.

VIEWS and REVIEWS

Managing the Future

LIKE philosophy, much of our industrial thinking deals with those problems to which we have not yet found a scientific answer, concerns either the shape of things to come or the relationships of people here and now.

Scientific Prognostication

Too much abstract thinking about such questions generally leads to unprofitable speculations as to the nature and aim of industry and commerce. The more concrete, real, objective, calculated, scientific our thinking on these matters can become, the better.

Fortunately, the history of industrial management is one of increasing application of scientific methods to fields previously worked over only by shrewd guesswork and inspiration. But the very success of the scientific approach in these fields has led to the uncritical demand for trying it in every field.

We must not suppose, however, that because we can ask a question there is necessarily an answer to it, still less that it is a scientific one, even if we use scientific methods to arrive at it. With this reservation in mind, consider the application of scientific methods to the problem of deciding whether a new laboratory development is worth pursuing.

Figuring the Future

Charles L. Sullivan declares in *I/EC* for September 1961, Vol. 53, No. 9, pp. 38A-42A, that there are at least 38 questions to be asked before even an approximate answer can be given, but that answer can be, he claims, a numerical one.

He first makes the obvious but nevertheless important point that, in order to get reliable answers to these questions, advice must be sought from the experts of various departments, indeed it is best if these experts can work together as a team on the project.

'Directing managerial thinking towards significant areas and developing a reasonably quantitative understanding of pertinent factors involves, at an early stage, laboratory, sales, marketing, production, engineering, accounting and purchasing'

'It is most important to have the right people, properly informed, thinking about the right things at the right time. All too often, projects have been underway for some time before a highly critical factor was discovered, which caused termination of the project, even though a considerable amount of money had been spent'.

Formalizing the Figures

Sullivan suggests that standard forms be set up for reporting the data and the estimates from the experts and that an attempt be made, preferably in concert, to quantify the answers to the questions and to calculate an overall rating from them.

This may not seem feasible in all circumstances but it can be done, with an effort, in nearly all, and at the lowest it will focus attention on the outstanding factors.

Of course, some of his 38 questions are more important than others and their importance may change according to the project concerned and the circumstances. For this reason, he suggests assigning a weighting to them in calculating the rating or average.

He rightly stresses that the problem is not one which can be completely answered by inspecting a single number worked out in this or any other way, that indeed a very low assessment for one of the important factors may be enough to kill the project at once. The weighted average rating is little more than an indication that no serious factor has been overlooked and that the project should be considered in more detail if the rating is high enough.

Interpreting the Figures

He gives a sample evaluation of a project undertaken to develop a new polymer, from which I would guess that his scheme is well worth studying, with a view to adapting it for one's own purposes and to one's own circumstances. It seems to me that the number of questions could be somewhat reduced by restating and grouping.

Sullivan recommends that all projects which have been carefully evaluated in this way should be submitted to top management, regardless of the rating which the work reveals. 'Any project which in some respects is especially attractive but happens to have a low rating should have its attractive features well elaborated for possible special consideration'.

He also makes the point that a reconsideration of projects which have not been adopted is worth while either from time to time or when new conditions arise. 'It is also desirable for the same people who established the ratings to meet at predetermined intervals, or sooner, if some factor changes significantly — *e.g.* appearance of an entirely new and unexpected competitive product which is superior in quality. . . .'

Planned Development

Sullivan concludes his paper by pointing out that 'this project evaluation system can be used also as part of a more elaborate control and evaluation system,' and he gives some ways in which this can be done.

I would like to go further — and perhaps Sullivan may like to consider doing so — and make a plea for using a system of this kind as part of a more general scheme of planned research and development, in which, however large or small the group, there would be deliberate planning of developments from start to finish, with conscious, explicit designation of each project, with assigned ends and methods, and periodic evaluation.

This would call also for a means of selecting or creating the projects in relation to the interests of the concern, its resources, traditions, and commercial outlook. This has wide implications for all businesses.

It would demand the gearing of the laboratory work to the whole by means of a standardized organization and correlative reporting.

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **F. C. JENNINGS**

I see research and development as a process of organic evolution which can be stimulated and accelerated by the direction, guidance, and control of human thought. Perhaps Charles L. Sullivan would like to have a go at that subject.

The Shapes of the Future

From the point of view of the rubber and plastics industry, *Kautschuk und Gummi*, after a statistical study of some aspects, gives an editorial welcome to Great Britain's joining the European Common Market, if only because it could create a future market of some 300m. people.

The present political situation of Great Britain in relation to the Common Market gives to English-speaking readers more than usual interest in two papers in the German and French press. They both deal with the influence of molecular shape on the shape of economic things to come.

Polybutadienes

In *Kautschuk und Gummi*, Vol. 18, No. 9/1961, Dr Frederico Engels of Chemische Werke Hüls contributes a study of 'The Importance and Development of Polybutadiene'. His thesis is that a circle has been completed in that while the first commercially-significant synthetic rubber was a butadiene polymer the world is now back to large-scale production of polybutadiene (the cis-1,4 polymer).

Most of the paper is a presentation of useful data on the properties of various polybutadienes having different cis-contents, gives results of studies of the effects of variations in molecular weight, temperature of polymerization, and oil extension.

It is shown that all these make possible a wide range of polybutadienes with properties of such great commercial interest that large factories are already planned or in being in USA, Great Britain, Germany, Holland, France, and Italy. In Germany, both Chemische Werke Hüls and Farbenfabriken Bayer at Leverkusen are planning production.

Polyisoprene

The Director General Adjoint of the Institut Français du Petrole contributes a long and thoughtful study of isoprene to *Revue Generale du Caoutchouc*, Vol. 38, No. 7-8, pp. 1083-1098, under the title 'World Trends in Rubber: Outlook for Isoprene', referring particularly to the use of C_5 cuts (though excluding the polyolefins).

Beginning in general terms, M. Giraud briefly sketches the effects on the properties of the polymer of the three main factors: nature of the monomer, molecular size, and type of arrangement. Like Dr Engel, he stresses the crucial significance of the stereo-regulating catalysts.

He sees the immediate future of rubber supplies to be concerned with natural rubber, SBR, polyisoprene, and polybutadiene, and he confesses that it is not yet possible honestly to choose between the last two. In these circumstances, he says, one must make an economico-technical comparison of the two processes for producing the polymers.

He asserts that it is broadly agreed that polyisoprene has properties identical with those of natural rubber, making it a complete substitute for it, while polybutadiene is superior to natural rubber in resistance to abrasion and in hysteresis loss, though lacking tack and having certain processing shortcomings (which, however, can be reduced by mixing with natural rubber or polyisoprene). Price and specific applications may ultimately determine the choice.

Economics of Stereospecific Rubbers

Giraud then outlines world trends in rubber consumption and production. He repeats the expert opinion that natural rubber production is likely to attain its maximum of 2,200,000 tons in 1970 and to get no higher. By this time, total world consumption of rubber may easily have risen to four times this figure.

Making up the deficiency will bring about intense competition between the different types of general-purpose synthetic rubbers, and the author thinks, in accord with R. P. Dinsmore, that, despite great efforts by the SBR interests, it will be the stereospecific isoprene and butadiene polymers which will mainly fill the gap.

'It seems then definite that one can consider that there will be room for factories making stereospecific rubbers with a capacity of the order of 500,000 tons in 1965, and at least 7-800,000 tons in 1970'.

Giraud examines with great care and detail the views of other experts in this field on the course of rubber consumption and production, presenting his conclusions in excellent charts, tables, and graphs.

Making Isoprene

He then makes an examination of costs in relation to these output figures and comes to the important conclusion, which he italicizes: '. . . *isoprene can from now on be obtained at a lower price than butadiene*'. He then demonstrates that polymerization costs are a little lower for isoprene than for butadiene.

He decides that if the stereospecific rubbers can be sold at a price below 25 cents per lb. they will rapidly take over part of the market of natural rubber, and even at a price of 25-30 cents per lb. for stereoregular rubbers the natural rubber market will tend to diminish.

Giraud finally describes at length the process of the Institut Français du Petrole for making monomeric isoprene of at least 99.4% purity, by reacting formaldehyde (prepared from methanol) by the Prins reaction with a hydrocarbon cut containing isobutylene (from catalytic- or steam-cracking or dehydrogenation of isobutene).

The formaldehyde produced is recycled after fractionation but there are other by-products and the author examines their chemical and economic possibilities, coming to the conclusion that a 'valuation of the by-products at 15 cents per lb. — which is no exaggeration for the outlets envisaged — will represent a cost reduction of 4 cents per lb. on the isoprene, making that figure less than 10 cents per lb.'.

CHARLES JENNINGS

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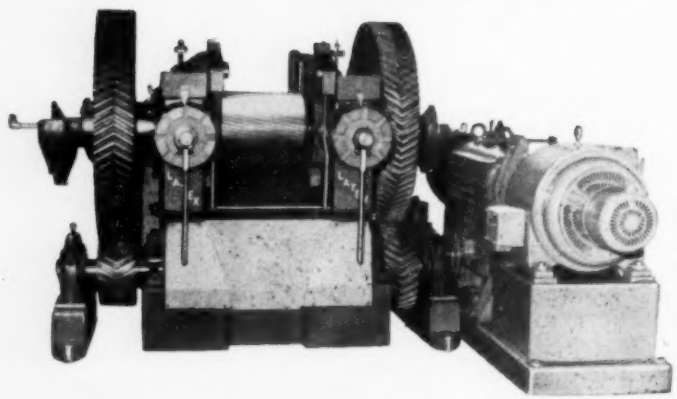

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MEN and MATTERS

A Review of People and Events

by Peter Richards

POURED instead of built, the Goodyear coloured polyurethane tyre aroused a great deal of interest at the Motor Show, which ends today (October 28).

The tyres have been strictly a research project for nearly two years and much more research and development lies ahead in this field before they can reach the market. But their potentialities are clear.

Translucent tyres may well be the tyre for the roads of the '70s. They are cast from specially compounded Neothane, a polyurethane with good resistance to cutting, punctures, and abrasion, and have no fabric, plies or laminations.

The tyres have already been road-tested at 65mph, with satisfactory results. Their smooth, glistening appearance, and receptiveness to virtually any colour, should open new opportunities for car designers.

To illuminate these tyres on road test cars, Goodyear engineers have mounted a number of small bulbs inside the rim and feed current through a special wiring device which makes the bulbs glow even at speed.

As Norman Hewitt, our American correspondent said when commenting on these tyres earlier this year (*RPW* February 11, 217) the inclusion of a light source is justified as a safety feature to those motorists not taken by the aesthetic appeal. Before this, a nocturnal pedestrian could only assume that oncoming headlamps were supported by wheels; in future he may be able to dodge with more assurance.

Package for Elements

Infra-red heating elements are among the most fragile items ever transported — the slightest knock can cause a fracture in the silica tubes and make them useless — but one of Britain's leading plastics firms has co-operated with a heating element manufacturer to solve the problem.

Kay Brothers Plastics Ltd., of Marple, Cheshire (a company in the Reckitt and Colman Group) has developed a foam package for Saville Electric Co., of Broxbourne, Herts. Kays has produced sheets of its F100 Foamoprene polyester foam profiled with parallel grooves on one side so that they will each cradle 25 of the fragile infra-red domestic fire heating elements. The tubes can therefore be packed in layers in a case with each tube nevertheless being individually protected in a resilient bed.

A spokesman for Saville Electric said: 'The elimination of excessive handling is a major factor, and two further advantages are that the packaging can be used repeatedly and the same sheet will take varying lengths of tube'. Elements made by the firm go to well-known appliance manufacturers for assembly into heaters.

From St. Louis to Milan

Irving C. Smith, of Monsanto Chemical Co., St. Louis, USA, is going to Italy to become deputy managing director and a member of the executive committee of Sicedison SpA of Milan. Sicedison is the second largest chemical company in Italy. It is 40% owned by Monsanto.

A Canadian, Mr Smith has been a vice-president (planning and control) and chairman of Monsanto's budget committee since 1958.

Changes at Tyresoles

Tyresoles Ltd. has made important changes in its publicity and sales departments. D. St. Clair McBride has assumed control of all public relations and publicity. For the past 12 years he has been publicity manager.

To assist Mr McBride, Mrs M. Webb has been appointed assistant public relations and information officer. Mrs Webb, who was formerly secretary to the sales director, has been with Tyresoles for 11 years.

D. S. McBRIDE

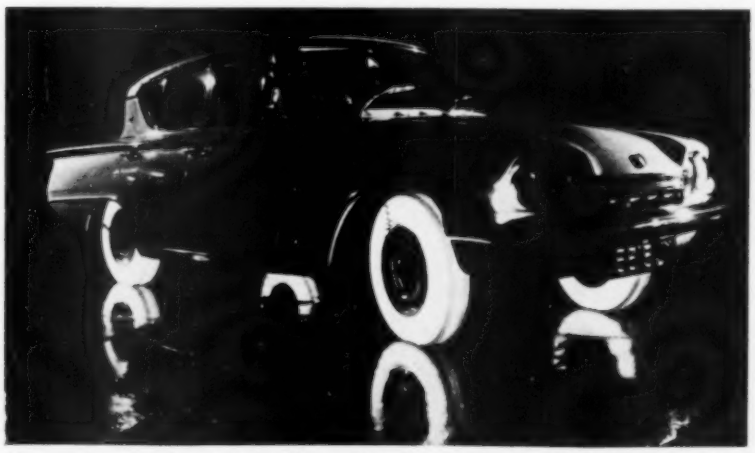
MRS. M. WEBB

On the sales side, I. D. C. Ballard has been promoted as London region sales manager and becomes responsible for all sales in the London region, which extends over the Home Counties. C. Olliff becomes sales development manager, his work covering market research and all company activities in the sales field, including sales training. H. Shortridge, at present in charge of sales training, retires in the New Year after 25 years' service with the company. He was one of the first Tyresoles representatives.

C. D. Tait has been appointed area sales manager (North Region), while B. R. Harris moves from the Midlands to London (West) as area sales manager.

Vitafoam Appointment

R. W. Simpkin has been appointed a director of Vitafoam Ltd. with special responsibility for the firm's future expansion in the field of trans-



Coloured tyres, shown at the Motor Show by Goodyear, add an extra touch of class to the Ford Classic. They have been developed as an approach to building tyres without fabric reinforcement *(see first story)*

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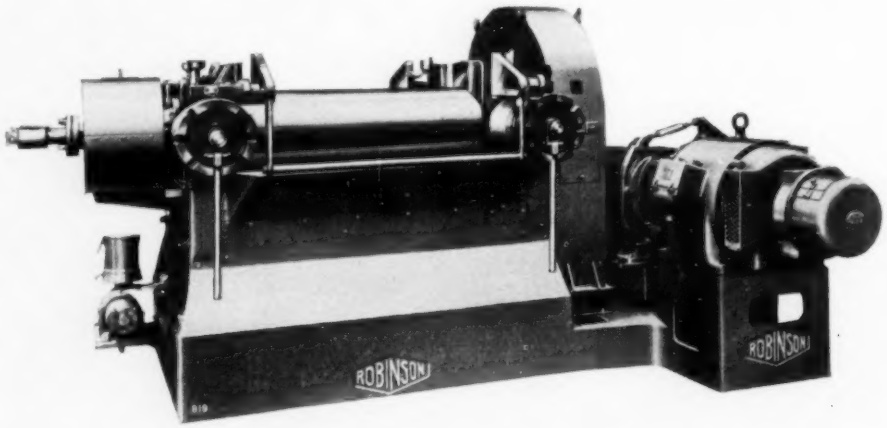

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port seating. He joined the firm in 1957 to establish Vitafoam's transport division of which he became general manager last year.

Progress at Shawbury

Since the foundation stone of the new plastics research extension to the RAPRA laboratories at Shawbury was laid last month (*RPW* September 23, 465) the building has been going up rapidly — presumably there is no tea-break trouble.

In a few months it will be complete, and ready for furnishing. Over the past 40 years RAPRA has been very fortunate to receive gifts of members' materials and products, and already offers have been coming in for rubber and plastics flooring, partitioning, light fittings, sink and bench tops for the new extension. Interested members should write to the Secretary of RAPRA, S. G. Loe, at Shawbury, Shrewsbury, Shropshire.

The intention is to use polymers as widely as possible — and the new laboratory certainly looks like being a showplace for the association's many visitors from home and abroad.

So far RAPRA has acknowledged offers of assistance from:

British Nylon Spinners Ltd., Monsanto Chemicals Ltd., Ekco Ltd., Shell Chemical Co. Ltd., Semtex Ltd., Bright Manufacturing Co. Ltd., British Resin Products Ltd., Dalmas Ltd., Evode Ltd., Expanded Rubber Co. Ltd., Farmiloe Sealants Ltd., Hackbridge Cable Co. Ltd., Henry Hawkins Ltd., Ioco Ltd., P. H. Muntz and Barwell Ltd., Dr J. H. Stern, Wandleside Cable Works Ltd., William Warne and Co. Ltd., Yorkshire Imperial Metals Ltd.

Polly Ester Says . . .

'Thixotropic — dim-witted hula-hula girl'

THE LEGAL ANGLE

A Job and a House

By a Barrister

ONE of the problems of obtaining — and keeping — good staff, is their accommodation. This applies particularly, of course, where someone is employed in an expert position, and even more so if he is imported from some other part of the country.

So what can the company do? The answer? Provide accommodation. Build a house, rent a house — and, in any event, offer a home to an important employee.

Proud Owner But . . .

'That's all very well', you say, 'but what if he leaves you? Or suppose that you want to get rid of him? What are your chances of getting the place back? Equally, what is the likelihood of your being the proud owner of premises of which you cannot obtain vacant possession for your employee's successor in office'

A prospective employee puts it differently. 'If I pull up my roots . . . move my children's school . . . spend money on moving . . . leave my present home for a new one . . . what security of tenure will I get when I arrive? How easy will it be for the company to shift me from my new house, if they decide to dismiss me from my job — or I decide to leave it?'

The answer, in each case, depends on the nature of the employee's right to remain in the premises. He may be either a tenant or a licensee. If he is a tenant, then you will only be able to move him in accordance with the terms of the tenancy. This may give him considerable security. But if he is a mere licensee — or, a service tenant — you will be able to get him out as soon as his period of service terminates.

There is one basic test used by the Courts in deciding whether or not the employee is a service occupier or a tenant. The question to be asked is, 'Is he *required* to live there for the better performance of his duties, or is he *permitted* to live there as a result of his employment?' In the first case, he will be a mere licensee, or, at the highest, a service tenant. In the second case, he will be a tenant.

Where a person is required to live on the premises in order that he may keep an eye on them . . . be available in emergencies . . . be better placed to open the gates in the morning or to lock up at night . . . then he is clearly a licensee. He occupies for the purposes of his service. Equally, where you provide a home for an employee and this is far away from your plant, factory, office or shop — then the man is a tenant — particularly if he pays you rent.

But there is much ground in between. A person may be required to live in a house far from the business and a deduction may be made from his wages or salary as payment for the privilege of staying in the company's house — but his occupancy may still be a service one. Equally, a man may live on the premises and if the circumstances are such to create a relationship of landlord and tenant between the company and himself, he may be a tenant and not a licensee.

The moral, then? Make an agreement in writing. If you are an employer and wish to obtain possession of the premises concerned when the service determines, you should specify in the agreement — or in the contract of service — that the employee is 'required' to live at the place concerned. You should avoid the use of such words as 'rent' or 'tenant' or 'landlord' — which suggest the presence of a tenancy. And you should specify that the employee must vacate the premises on the determination of his contract of service. Do this and the chances are that whether the service be determined summarily or by the giving of notice or salary in lieu, you will get the place when you need it.

Call Company 'Landlords'

On the other hand, if *you* are invited to accept a position which means that you will have to move your home and your new employers will provide you with another one — you must see that the agreement provides that you should be given a specified period of notice before being forced to leave your new home. Call payments 'rent', refer to the company as your 'landlords' — and, in any event, see that you are given reasonable time to quit.

Follow these rules and you will not go wrong. You will keep a roof over your head — or that of your important employees — when it is needed most.

Plantation Newsletter

CONTROLLING THE QUALITY OF RUBBER EXPORTS

FROM KUALA LUMPUR

THE Rubber Shipping and Packing Control Ordinance is now being reviewed to make it a more effective instrument for controlling the quality of rubber exported from this country.

Recently, the Minister of Commerce and Industry, Inche Mohamed Khir Johari, said the Malayan Rubber Ex-Port Registration Board set up under the ordinance had been ineffective of late and needed a 'thorough overhauling'.

A joint working committee of two Federation and two Singapore experts is now reviewing the ordinance in the hope of remedying the defects. On the Federation side are Lew Sip Hon, controller of the export division of the Ministry of Commerce and Industry; and Inche Abdullah bin Abdul Kadir, assistant controller. They are assisted by a Colombo Plan draftsman, P. H. See.

Singapore is represented by Sim Kee Boon, deputy director of the trade division of the Ministry of Finance; and Tan Guan Aik, the assistant director. So far, Singapore has not named its legal draftsman.

The working party, which is empowered to co-opt members of the rubber trade in the Federation and Singapore, met for the first time recently.

At present the Export Registration Board consists only of rubber traders and producers. An informed source said: 'It is rather difficult for members of the trade to pass judgment on themselves. Generally they are reluctant to be harsh on anyone who falls out of line'.

The *Natural Rubber News*, commenting on the problem, said that the Malayan Rubber Export Registration Board proved reasonably effective in improving the standards of Malayan rubber in the early days of its existence. But, however, latterly the Board had become somewhat moribund and the proposed reorganization should make it a more active and effective quality control agency.

Replanting Scheme

Meanwhile, the president of the Malayan Estate Owners Association, Mr Gunn Lay Teik, this week dispelled fears that estates were not taking full advantage of the replanting scheme. He told the annual meeting of the association that 70,000 acres were replanted by estates owners last year.

'It is expected that up to the middle of October this year, another 60,000 acres will have been replanted', he added.

Mr Gunn, who until early this year was Malaya's High Commissioner in Australia, said much concern had been expressed last year about estates, especially the medium-sized ones, not taking full advantage of the replanting scheme, but the figures showed a brighter picture.

'I am glad that the campaigns by the association and other similar organizations to get people to replant have proved successful', he said.

by our
Malayan Correspondent

Mr Gunn said that the new high-yielding trees would make it possible for the Malayan rubber industry to continue to prosper. Recalling a recent visit to Britain where he had met leaders of the rubber industry, he said he had come away with the conclusion that as long as Malaya kept a high level of efficiency and reduced costs they would be able not only to meet the competition from synthetic, but also to prosper side by side with it.

He was re-elected president with Mr Gan Tek Yeow as vice-president. The association enrolled 95 new members during the past year.

Roaring Fire

A roaring 2hr. fire on Sungei Tinggi estate near Batang Berjuntai, 40 miles from here, caused damage estimated at $1m. (about £120,000). Several hundred thousand dollars worth of crepe rubber, two drying sheds, a general store and a factory office were destroyed. Part of a latex factory was also gutted.

The estate is owned by Socfin and Co. Ltd. During the height of the fire drums of paint and several cylinders of gas kept in the store were heard exploding. A strong breeze blew sparks over a radius of 100yd. No one was hurt in the fire.

However, many estate labourers evacuated their homes and moved their belongings to the middle of a football pitch. Women carried their children to the middle of the field and waited for the fire to be brought under control. Fortunately their quarters were not affected.

Tapping Stories

The changing times in Malaya is well illustrated in two stories which came to light this week. The first was a link with the past with the death of one of Malaya's oldest Europeans, Charles Ernest Cumming, who came to this country 68 years ago from Kent.

Mr Cumming, one of the pioneer rubber planters, was accredited with inventing the tepong tapping knife, an improved modification of which is still in use today.

The second story concerns a young Indian lad, S. Subramaniam, 21, who has just received a diploma in civil engineering from the Technical College here. Subramaniam is the first tapper's son ever to receive such an award.

Both his mother and father are tappers. The young engineer now plans to join the Public Works Department.

18 Employees: 550 Years' Service

EIGHTEEN employees of Iddon Bros. Ltd., the rubber and plastics engineers of Leyland, Lancashire, have each been presented with a canteen of cutlery for the services they have given to the firm during 25 years' employment.

The presentation was made by H. E. Iddon, managing director, in conjunction with co-directors, D. B. Iddon and D. S. Heane, to: H. Culshaw, J. Davies, F. Forrest, F. Hilton, E. Hindle, T. Holden, A. Jump, R. Laidlow, F. Marland, F. Raby, J. Ratcliffe, W. Ryding, S. Topping, F. Vose, W. Wildman, J. Williams, F. Woods and F. Yates.

Several of these employees have been with the firm from as early as 1915, and the company says that their high standard of craftsmanship and experience has contributed towards establishing Iddon Brothers as one of the leading manufacturers of rubber and plastics machinery in the world.

Rubber and Plastics Stock Market

A REVIEW OF PRICES AND TRENDS

EXPORTS. Profit margins. These are the two factors that could determine stock market trends very considerably over the next year or so. For some time now company bosses have been fed on such slogans as 'export or die', 'it's fun to export', and the rest. Governments of different shades have been on to industry to get abroad and sell. And only just recently one of the first gentlemen of the realm stressed that all and sundry should get their fingers out, which I must say has its own kind of interpretation. Since the war, in fact, a lot has been done to keep exports on a rising scale. Immediately after the war, of course, we had a head start on some of our biggest continental competitors like Germany, France and Italy. But this lead has now been severely trimmed. Now these countries have more than made up the ground lost and as a result our own export efforts have been braked. This is why the trade 'gap' has become such an important barometer. For until we are able to balance the difference between what we sell and buy from abroad our economy will stagger from one crisis to the next. With a high Bank Rate the companies find the going even harder and competition is such today that many of even the bigger industrial companies have been forced into cutting profit margins. It is almost a daily event now to hear from the boardrooms that sales hit new records. But net profits returned are more often or not down on the previous years' figures. So it's something of an event when one of the best-known names reverses the procedure.

DUNLOP RUBBER did just that recently. In a half-time statement Sir Edward Beharrell, the chairman, told shareholders that the actual extent of the improvement in profitability was an increase from 5% to 5.2% in the relationship between pretax profits and turnover. This was in spite of the fact that the group suffered a slight setback in sales which is not much of a surprise when one considers the slowdown in the motor industry's growth rate just recently. There are obviously some important influences which are helping Dunlop at present and in the first instance the stock losses which amounted to £400,000 last year have more than likely been largely avoided for the trend in rubber prices has been more favourable this year. The group also stands to benefit progressively as a result of its steady reduction in reliance upon natural rubber in favour of the synthetic product. The recent heavy rate of capital expenditure upon new factories, modernization must be playing an important role now as well. Despite the credit squeeze and the gloomy outlook for car production,

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Share Price Movements

Par Value	Company	1961 High	Low	Oct. 14	Latest
£1	A.E. Ind. Ord.	48/6	28/3	30/3	30/6
5/-	Albright & W. Ord.	29/6	20/3	21/6	21/6
£1	" " " 5% Pref.	17/3	13/-	13/-	13/6
5/-	Anchor Chemical Ord.	25/6	16/-	19/-	16/3
4/-	Airfix	39/6	17/-	33/6	37/3
4/-	" Non Voting	32/-	16/-	29/-	30/6
5/-	Andersons Rub. Ord.	—	—	3/9	3/9
£1	Angus Geo. Ord.	83/-	58/6	68/9	67/3
5/-	Ault & Wiborg Ord.	17/-	12/9	14/9	14/-
£1	Avon India Rubber Ord.	46/6	30/-	37/6	36/3
£1	" " " 6% Pref.	19/3	17/6	17/6	17/6
10/-	Bakelite Ord.	66/3	42/3	46/6	46/6
£1	" 6% Pref.	19/3	16/6	17/3	16/6
£1	Baker Perkins Ord.	59/6	40/6	45/6	44/6
4/-	Bank Bdg. Rubber Ord.	3/6	1/9	2/3	2/-
4/-	Bettix	11/9	7/6	9/-	8/9
4/-	Brammer H. Ord.	17/-	13/9	13/9	13/9
10/-	Bridge, David Ord.	60/-	28/9	31/3	31/3
5/-	Bright, John Ord.	9/6	6/-	6/6	6/-
5/-	Brit. Blting. & Asb. Ord.	24/-	17/6	19/3	19/-
£1	" " " " Pref.	—	—	13/3	13/3
5/-	British Electronic Indus.	15/6	9/6	11/3	10/6
£1	BICC Ord.	62/6	49/-	56/3	55/-
5/-	BTR Ind. Ord.	18/9	8/9	8/9	10/9
£1	" " 7½% Pref.	21/6	19/6	21/-	20/-
10/-	Castrol Ord.	52/-	37/-	39/3	37/3
£1	Courtaulds Ord.	47/6	30/-	34/3	32/9
£1	" 5% 1st Pref.	16/-	13/9	14/-	14/-
£1	" 6% 2nd Pref.	18/3	15/9	16/-	16/-
4/-	Cow, P. B. Ord.	10/6	7/6	9/-	8/9
£1	" " 5% Pref.	14/3	12/6	12/6	12/6
1/-	Dannimac Mfg. Ord.	16/3	10/6	15/-	14/6
10/-	De La Rue Ord.	70/-	47/-	51/-	47/-
£1	" " " 3¼% Pref.	10/6	9/6	10/-	10/-
10/-	Distillers Co. Ord.	41/3	31/-	36/3	36/9
£1	" " 6% Pref.	20/3	17/-	17/6	17/6
£100	" 5% Conv. Loan	£96	£90	£92	£91½
£100	" 5½% Unsec. Loan	£86½	£72	£74½	£75
10/-	Dunlop Rubber Ord.	29/-	21/6	26/6	25/9
£1	" " 5½% Pref.	16/-	13/9	14/3	14/6
£100	" 3½% 1st Debs.	£69	£67	£69	£69
£100	" 4½% 2nd Debs.	£79	£74	£75	£74½
£1	Eng. Elect. Ord.	40/6	26/3	27/3	28/9
4/-	Ebonite Cont. Ord.	8/6	4/9	5/-	5/3
£1	English China Clays Ord.	117/6	80/-	98/6	97/-
£1	Goodyear Tyre 4% Pref.	11/6	9/9	10/-	10/-
5/-	Greeff Chem. Ord.	37/7	22/6	23/-	22/6
10/-	Greeff Chem. 5½% Pref.	8/3	6/9	7/-	7/-

Par Value	Company	1961 High	Low	Oct. 14	Latest
4/-	Greengate & Irwell Ord.	6/9	4/6	4/6	4/6
5/-	Hackbridge Hldg.	6/9	4/9	6/-	5/3
£1	Harrisons & Crosfield Dd.	57/6	45/-	49/-	45/6
1/-	Hunt & Moscrop Ord.	2/3	1/3	2/-	2/-
£1	Imp. Chem. Ord.	81/6	56/3	60/6	59/9
£1	" " 5% Pref.	16/3	13/6	14/9	14/9
£100	" 4½% Unsec. Loan	£83	£76½	£78	£77
£100	" 5½% Conv. Loan	£93	£86	£87½	£87
5/-	Laporte Ind. Ord.	28/9	18/3	18/9	19/-
£1	" " 7½% Pref.	23/-	20/-	19/6	20/-
£1	Leyland & Birm. Rubber Ord.	59/3	38/9	41/-	39/6
£1	" " " 6% Pref.	18/9	15/-	15/-	15/-
2/-	London Rubber	15/6	9/6	13/-	12/9
£1	" 6% Red. Cum. Pref.	20/-	16/9	17/6	17/6
£1	McKechnie Bros. Ord.	43/-	27/-	38/9	38/9
£1	" " 'A' Ord.	45/-	32/6	33/-	33/-
£1	" " 6% Cum. Pref.	18/-	16/-	16/6	16/6
5/-	Monsanto Chem. Ord.	27/6	14/6	15/3	15/-
£1	" " 3¾% Pref.	12/6	10/9	11/-	11/-
£100	" " 6% Debs.	£98	£88½	£89	£89
5/-	Miles (H.G.) Hldgs. Ord.	7/9	7/-	7/3	7/3
2/-	Movitex	7/6	4/6	4/9	4/6
£1	North British Rubber	21/3	11/3	11/6	11/3
5/-	Northwestern Rubber	13/-	9/-	12/-	12/-
5/-	Plastic Enginrs. Ord.	40/-	28/3	28/3	28/3
10/-	Projectile & Eng. Ord.	50/6	22/6	37/6	36/-
5/-	Redfern Holdings Ord.	4/-	2/9	3/9	3/9
2/-	RFD Ltd. Ord.	6/3	3/6	4/-	4/-
£1	" " 5½% Pref.	15/-	10/6	11/3	11/3
2/-	Rubber Imp. Ord.	6/3	3/-	3/3	3/-
2/-	" " 'A' Ord.	5/-	2/3	2/3	2/6
£1	" " 5% 1st Pref.	13/3	11/3	12/3	12/3
5/-	Rubber Reg. Ord.	18/3	13/6	13/9	13/9
4/-	Shaw Francis Ord.	24/6	13/9	14/3	14/3
£1	Shell Ord. (Reg.)	140/-	108/-	117/3	116/-
2/-	Silentbloc Ord.	10/6	7/3	8/6	7/6
5/-	Storey Bros.	46/-	30/-	35/-	30/6
2/-	Sussex Rubber Ord.	2/7½	1/9	1/9	1/9
5/-	Sutcliffe Speak Ord.	18/6	12/6	12/6	12/6
£1	Tootals	35/6	23/-	25/-	23/3
£1	Turner & Newall Ord.	78/-	55/-	59/6	57/9
£1	" " " 7% Pref.	21/6	19/-	20/3	20/3
5/-	Universal Asbestos Ord.	27/-	20/-	22/9	21/3
£1	Venesta Ord.	76/-	55/9	59/9	56/9
5/-	Viscose Dev. Ord.	16/3	13/3	14/9	14/6
5/-	Warne W. (Holdgs.) Ord.	21/6	14/9	17/6	17/6

Rubber Markets

LONDON

Rubber values were weak during the five-day trading period ended October 25, and lost a ½d. to ¾d. per lb. However, traders said that the decline does not reflect any increase in selling pressure, but was rather a sympathetic move to similar price falls in Singapore. Small covering enquiry was attracted by the lower levels in the landed market, but once again demand for cif parcels was somewhat selective. Nevertheless, some increased offtake in November shipment No. 1 RSS and in No. 3 — both November and December — was noted towards the end of the period. Off-grades were quiet, although some interest in 2X brown was evident early in the week.

Latest prices are as follows:
No. 1 RSS Spot: 23⅞d.-24d.

Settlement House:
November 23⅞d.-24d.
December 24d.-24⅛d.
January 24d.-24⅛d.
January/March 24⅛d.-24¼d.
April/June 24¼d.-24⅜d.
July/September 24¼d.-24⅜d.
October/December 24¼d.-24⅜d.

No. 1 RSS cif basis ports:
November 23⅛d.-23⅜d.
December 23⅜d.-23¾d.

Godown:
November 79 buyers (Straits cents).

LATEX

Centrifuged 60% latex per gallon in drums, seller, November, December, 13s. 9d., cif European ports. Spot, seller, 14s. 3d. Bulk, seller, d.w. 13s. 8d. Normal, seller, November, December, 10s. 9d.

NEW YORK

The New York rubber market ruled as under on October 23:

DEALERS' PRICES

	US cents per lb., ex-dock	
	Oct. 23	Previous
No. 1 RSS, Oct.	28⅞b–29¼a	29b –29¼a
Nov.	28⅞b–29a	28⅞b–29¼a
No. 2 RSS, Oct.	28⅝b–29a	28⅞b–29¼a
Nov.	28⅝b–28⅞a	28⅝b–29a
No. 3 RSS, Oct.	28⅝b–28⅞a	28⅝b–29a
Nov.	28⅛b–28⅞a	28⅝b–28⅞a
No. 1 RSS, Spot	29⅛n	29⅛n
No. 3 amber blanket crepe, Oct.	26⅛n	26⅜n

FUTURES—REX CONTRACT

	Oct. 23	Prev. Close
Nov. ..	29.10b–29.60a	29.50b–29.70a
Jan. ..	28.75b–29.85a	29.00b–29.10a
March ..	28.50b–28.65a	28.70b–28.80a
May ..	28.40b–28.60a	28.60b–28.75a
July ..	28.35b–28.60a	28.55b–28.75a
Sept. ..	28.35b–28.60a	28.55b–28.75a
Nov. ..	28.35b–28.60a	28.55b–28.75a

Sales: Nil. Tendency: Dull.

Rubber futures were very quiet on October 23. The undertone was barely steady. Traders said that physical rubber was very quiet. The tone was given as barely steady. Factories were showing negligible interest in the market. In late trading, futures remained very quiet. The undertone to the Rex contract was softer.

SINGAPORE

The market ruled very quiet on October 23 and featureless. There was a general lack of trading interest, with the exception of lower sheets which were in fair demand. The main buying level, however, was slightly below market prices. The market continued dull throughout the afternoon. Sellers were pressing slightly. Exchanges were light.

	Malayan cents per lb., fob Malayan ports to open ports	
	Oct. 23	Prev. Close
No. 1 RSS, Nov. ..	81⅞–82⅛	82⅞–83⅛
Dec. ..	82⅛–82½	83⅛–83½
No. 2 RSS, Nov. ..	81 –81½	81⅞–82⅜
No. 3 RSS, Nov. ..	79 –79½	80 –80½
No. 4 RSS, Nov. ..	77½–78	78 –79
No. 5 RSS, Nov. ..	75 –76	76 –77
No. 1 RSS, Prompt	81⅝–82	82⅛–82⅞
No. 3 blanket thick re-milled crepe, Nov.	74 –75	74½–75½
No. 1 fine pale crepe, Nov.	91½–92½	91⅞–92⅞
2X thin brown crepe, Nov.	72 –73	72⅞–73⅞

Tendency: Dull.

AMSTERDAM

The Amsterdam rubber market ruled as under on October 23:

No. 1 RMA	Guilders per kilo Oct. 23	Previous
October	2.30	2.32
November ..	2.30	2.32
December ..	2.30	2.32
Oct. Dec.	2.30	2.32
January	2.30	2.32
February	2.30	2.32

Sales: Nil. Tendency: Quiet.

DJAKARTA

	Rupiahs per kilo Oct. 23	Previous
Spot, No. 1 Priok ..	35.75b	35.50b
Spot, No. 2 Priok ..	34.75b	34.50b
Spot, No. 3 Priok ..	33.75b	33.50b
Spot, No. 1 fine pale crepe	35.00n	35.00b

Tendency: Steady.

CEYLON

The price of No. 1 RSS at Colombo on October 23 was 98 (99½) Ceylon cents per lb.

BANGKOK

The price of No. 1 RSS at Bangkok on October 23 was 26.50 (26.62½) US cents per lb.

IRI GOLF

Manchester: Autumn Trophy

The Manchester section of the Institution of the Rubber Industry Golfing Society held its Autumn Trophy Competition at the Royal Lytham and St. Anne's Golf Club, in conjunction with its annual general meeting.

The competition was, as usual, played under Stableford rules and, despite very blustery weather, some extremely good scores were turned in, the winner being S. K Roberts with 33 points.

The course was in excellent condition — especially since the Ryder Cup had only recently been played there.

Thirty-five members of the section took part in the competition and sat down to an excellent dinner in the evening.

The captain, S. Heywood, thanked the donors of prizes, which enabled the section to distribute a total of 13 prizes to the players.

The results of the competition were: S. K. Roberts 33 points, G. H. Robinson 31, E. Morris 30, T. R. Waring 29, J. D. R. Hill 29, A. Lord 28, S. T. Diggle 27, J. L. Ferguson 27, I. Ferguson 27, R. N. Ferguson 27, M. Ferguson 26, L. R. Allanby 24, and G. Halstead 24.

At the annual general meeting, held after the dinner in the evening, Arnold Whitehead was elected captain for 1962.

The captain and committee express their appreciation to the following for generously donating prizes for this event: T. A. Wilson, H. W. West, J. H. Carrington, G. Betts, A. Whitehead, S. K. Roberts, E. Morris, A. Sanders, T. R. Waring, S. A. Mouseley, N. Liddiard, G. H. Manketelow and A. W. Ayres.—G.C.S.

Commercial Plasticizers

In the first article in the current series on plasticizers for pvc (September 30, 504), by W. S. Penn, reference was made under Tables 1 and 2 to Irano products and to Iranolins.

We have now been informed that the company and the products mentioned no longer exist under these headings, having now been replaced by BP Trading Ltd. and BP Extracts.

Calls for Tenders

Rubber and Plastics Flooring

EFFDEA (Argentine State River Shipping Authority) has issued a call for tenders, No. 55/61, for rubber and plastics flooring. Specifications and other details are available from the Administrador General EFFDEA, Avenida Corrientes 389, Piso 2, Buenos Aires. Quotations should be cif Cadiz, Spain. Closing date: November 2 1961 (Ref. ESB/32513/61).

Industry INTELLIGENCE

Technical Data

Polymer Reports

Polymer (UK) Ltd., Walbrook House, Walbrook, E.C.4, has issued four technical reports dealing with SBR and butyl products. No. 61 : 7A introduces Polysar butyl 450 which is a recent development by the Research and Development Division of Polymer Corporation.

No. 61 : 8A deals with Polysar Krynac hard roll covers, and presents formulations for hard, white, polysar Krynac roll compounds which are claimed to be easy to process.

Report No. 61 : 8B contains information on Polysar butyl leaf-spring pads which are used between the leaves of automobile springs to eliminate metal to metal contact at the friction points.

Report No. 61 : 8C reports on Polysar S-X370 used for improved processing. Polysar S-X370 is a non-staining, cross-linked butadiene-styrene elastomer which is used as a partial replacement for general purpose, oil resistant, or natural rubbers to improve the processing properties of their compounds.

I.C.I. Silicones

Imperial Chemical Industries Ltd., Nobel Division, Silicones Department, Stevenston, Ayrshire, Scotland, has issued a folder containing sheets giving the latest information on I.C.I. silicones for textile treatments.

I.C.I. supplies several silicone products for the treatment of textiles. The treatments are of the water emulsion or solvent type and application techniques include pad mangling, exhaustion, dipping, brushing and spraying. The applications of these silicone water repellents to textiles are described in detail in the two data sheets in the folder 'Textile Finishing — Wool Goods' and 'Textile Finishing — Cellulosic and Synthetic Fabrics'.

Blow Moulding Material

A new Technical Information Sheet (No. 13 — Blow Moulding of Rigidex Polythene) has been issued by British Resin Products Ltd., Devonshire House, Piccadilly, W.1.

Performance data on Rigidex types 2 and 9 (homopolymer) and types 3 and 12 (copolymer) is given, together with information on typical conditions for manufacturing blown containers from these four grades and details of mould design — which cover the whole field of current blow moulding applications.

Good chemical resistance, low permeability, and resistance to environmental stress cracking are shown by Rigidex copolymers which are therefore of particular interest in packaging applications.

Polythene Shipping Bags

Bakelite Ltd., 12 - 18 Grosvenor Gardens S.W.1, has issued technical memorandum D.122, on the packaging of raw materials in polythene shipping bags.

Because of its strength, clarity and low cost, polythene film has been used in the packaging of retail consumer goods. Intensive investigation shows that it can also be used for the packaging of granular materials and information on this aspect is included in the memorandum.

Machines, Materials and Equipment

Collapsible Transport Pallet

E. Stephens and Son Ltd., 58/66 Bath Street, London, E.C.1, has introduced a standard form of collapsible post or box pallet that can be supplied to any size requirement and yet, in its collapsed form has an approximate height of only 8in., thus conforming to railway return travel requirements. The link-joints which allow the permanently attached posts to collapse, are such that the posts, square or round, are held rigidly in their erected state so that they need no form of bracing.

The detachable sides which can be mesh or sheet, are easily removed, replaced or exchanged and although there are no buttons, screws or catches involved, it is claimed that there is, due to a simple feature in the design, no fear of their coming adrift in the collapsed position.

Identification Sleeve

Hellermann Ltd., Gatwick Road, Crawley, Sussex, has introduced Helagrip, a new addition to the range of Hellermann identification sleeves. It is made from flexible pvc, and designed for fitting without the aid of tools, being supplied in sizes covering the cable diameters $\frac{1}{8}$in. to $\frac{1}{16}$in.

Helagrip is interlocking and remains in position when cables are turned at 90°. The interlocking design is claimed not only to ensure alignment of characters but also facilitates fitting. It is supplied in a standard colour of white with black printing and in strip form.

Chlorine Recorder

The Paterson Engineering Co. Ltd., 129 Kingsway, W.C.2, has introduced the BM Residual Chlorine Recorder, which operates on a new principle for instruments of this type. This recorder has been developed to fulfil the need for a unit which is strongly built and accurate in operation and yet requires little maintenance. It operates on the bi-metallic cell principle, and employs a small perspex constant head chamber of orthodox overflow type in which the sample water is received and measured.

The BM Residual Chlorine Recorder is housed in a reinforced glass fibre cabinet occupying a floor area of 24in. x 24in. Full particulars can be obtained from the company.

Publications

Oyma BSH in PVC

Omya BSH in a surface-treated champagne whiting manufactured by Pluess-Staufer AG of Switzerland. It is widely used as a filler for many thermosetting and thermoplastic materials.

A 29-page booklet, Technical Bulletin No. 173, Part 1, issued by Croxton and Garry Ltd., 27 St. James Road, Kingston-on-Thames, Surrey — UK suppliers of Pluess-Staufer materials — is called 'More reasons for using Omya BSH in pvc'.

This describes in some detail many aspects of the use of this material as a filler for pvc compounds. It includes a study of the effect of the price of the filler on the total material cost of the compound. Comparisons are given between Omya BSH, natural untreated calcium carbonates and surface treated calcium carbonate. Also mentioned are the replacement of whiting by Omya BSH with adjustment of the plasticizer content and the method of substituting carbonate fillers by Omya BSH.

Glass Fibre Materials

A booklet called 'Fiberglas Materials for Matched-Die Moulding Selection Guide' for moulders has been published by the Reinforced Plastics Division of Owens-Corning Fiberglas Corporation.

The three basic matched-die moulding processes — pre-formed moulding, pre-mix moulding and mat moulding — are graphically described, along with a discussion of reinforcing materials best suited for each process. Processing characteristics and laminate properties of each material are included. The booklet contains complete descriptions of the four basic fibreglass non-woven reinforcements — spun strand roving and continuous strand roving, chopped strand mats and continuous strand mats. Also described are Owens-Corning overlay and surfacing mats designed for use with the basic reinforcements to provide improved surface finish.

Copies of the brochure, Pub. No. 5-PL-1851, are available from Owens-Corning Fiberglas International, S.A., 717 Fifth Avenue, New York 22, New York.

PLASTICIZERS FOR PVC — PART 7

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Conclusions

It will have been appreciated from the detailed descriptions of plasticizers which have been given that the industry is now very large. Although many companies still receive plasticizers in drums, many also take them in tanker, an indication of the large amount of material used.

In spite of the plasticizer developments which continue at an amazing rate, DOP and its substituents are still by far the commonest. By 'substituents' is meant DIOP and the Amphanol type plasticizers, which are being used on an enormous scale. TTP is also still quite common. This does not mean, however, that new varieties should not be studied. It will be found that substitution of existing types with proportions of the new types can not only improve vinyl properties but also processing characteristics. Apart from this aspect, the polymeric plasticizers are coming very much to the fore with the requirements of higher temperatures in pvc applications.

The plasticizer industry is a virile one and should be regarded as such. Continual efforts should be made to reduce costs and improve properties by the examination of new materials, both primary plasticizers and extenders. The latter certainly have not been sufficiently explored which seems strange in view of the large savings which can be made.

Although the number of plasticizers is large, it is still growing rapidly and new types will have to be examined as they appear if the picture is not to become more confused. Each new plasticizer should be placed carefully in its group since this will help avoid confusion and possible duplication.

Rubber Statistics

Singapore/Malaya Imports

Imports of foreign rubber into Singapore and Malaya during September amounted to 39,210 tons (actual arrivals 46,164), as shown by final documents received, according to preliminary figures issued by the Chief Statistician.

This compares with August figures of 36,999 tons (actual 39,082).

The September figures included 18,669 tons imported on provisional permits in previous months for which final documents have been received, and exclude approximately 25,623 tons imported during the month for which final documents have not yet been received.

Future Events

Plastics Institute

October 31 and November 1 at the Institution of Electrical Engineers, Savoy Place, London, W.C.2. Conference on 'Engineering with Plastics'. The conference dinner will be held at the Connaught Rooms on October 31.

London and District Section. — November 2 at the Criterion in Piccadilly. Annual luncheon. Guest speaker: A. Dickson Wright (senior surgeon at St. Mary's Hospital and Prince of Wales Hospital).

North-Eastern Section. — November 1 at the Eldon Grill, Eldon Buildings, Grey Street, Newcastle. 'The Properties of Silicones and Their Application', by R. Nattrass, BSc (Midland Silicones Ltd.). Time 7 p.m.

North-Western Section. — November 3 informal dance.

Southern Section. — November 2 at the Chemistry Department of the University of Southampton, at 7.30 p.m. 'Plastics and Other Non-metallic Materials in Rocketry', by P. Mullen (Chemistry Department, Royal Aircraft Establishment).

Export Issue

Subscription Copies

It has come to our notice that a number of subscribers' copies of the export issue of *RPW* (October 21) were damaged in the post.

If any subscriber wishes to have a damaged copy replaced (free of charge) he should write as soon as possible to: Circulation Dept., Rubber and Plastics Weekly, 131 Great Suffolk Street, London, S.E.1.

STOCK MARKET

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similar results are expected this year as last. Meantime the directors have stepped up the interim dividend from 3¼% to 5% with a view to reducing the disparity between the two payments.

News from TOOTALS, the textile firm which has diversified into plastics, is that its interests in this field has suffered something of a setback. Whereas in the preceding two years this division made a substantial contribution towards profits, the past one was unsatisfactory. Said chairman, T. A. Fairclough, 'The plastics division has been geared to a substantial extent to the production of components for those industries particularly susceptible to the effects of credit restrictions, but plans to establish products that will provide a broader basis for the business are already in operation'.

Latest Wills

Norman James Alexander, of Goldstrow Farm, Piltdown, near Uckfield, Sussex, formerly of East Mains of Dunnichen, Aberlemno by Forfar, Scotland, late of Malaya, retired rubber planter, who died on March 10 last, aged 55 years, left estate in the UK valued at £28,176 net value.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationary Office.

Corbex (820,487). Jointing (packing) materials. Jointine Products Co. Ltd., North Hykeham, Lincoln, Lincolnshire. (Class 17; August 16 1961.)

Chemidor (820,622). All goods included in Class 17. Chemidus Plastics Ltd., Dominion Buildings, South Place, London, E.C.2. To be associated with No. 742,812 (4,063, 435) and others. (Class 17; August 16 1961.)

Pactaflex (820,821). Packings and jointings in the nature of packings, all for rotary shafts of machines. Flexibox Ltd., Nash Road, Trafford Park, Manchester, 17. (Class 17; August 16 1961.)

(817,259). Bag-like contrivances, made principally of textile materials or of plastics sheeting, for protecting clothes. Jekmoth Home Store Limited, Jekmoth House, 11-15 Lillie Road, Fulham, London, S.W.6. (Class 24; August 16 1961.)

Saga Cargo (808,192). Bearing plates made of rubber used in connexion with the beams of bridges and for use in industrial building constructions. Società Applicazioni Gomma Antivibranti S.A.G.A. Società per Azioni, via Ripamonti No. 88, Milan, Italy. Address for service is c/o G. F. Redfern and Co., Redfern House, Dominion Street, London, E.C.2. (Class 19; August 16 1961.)

Isokote (818,577). Tanks included in Class 19 made of concrete and having a lining of polyester resins and glass fibres. Extrudex Ltd., Western Road, Bracknell, Berkshire. To be associated with No. 818,578 (4,329, 1,116) and others. (Class 19; August 16 1961.)

Jablite (819,795). All goods included in Class 19. Jablo Plastics Industries Ltd., Mill Lane, Waddon, Croydon, Surrey. (Class 19; August 16 1961.)

Grasshopper (795,465). Hand travelling bags and cases made of leather, fibre board, plastics or woven textile fabrics or combinations of these materials. Atlantic Products Corporation, 1 Johnson Avenue, City of Trenton, State of New Jersey, USA. Address for service is c/o Stevens, Langner, Parry and Rollinson, 5 to 9 Quality Court, Chancery Lane, London, W.C.2. (Class 18; August 16 1961.)

Polystop (814,548). Stoppers of plastics materials. John Poulten Ltd., 77/85 Tanner Street, Barking, Essex. (Class 20; August 16 1961.)

(B790,348). Floats of plastics for line fishing. Knut Beyer-Olsen and Otto Steffenssen, trading as Polyform, Beyer-Olsen OG Steffenssen, Kirkegaten 10, Alesund, Norway. Address for service is c/o A. A. Thornton and Co., Northumberland House, 303-306 High Holborn, London, W.C.1. (Class 28; August 16 1961.)

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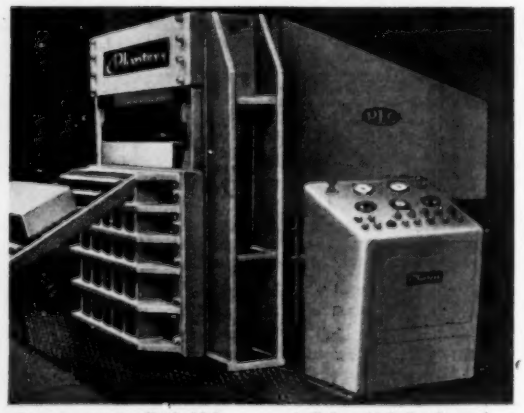

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